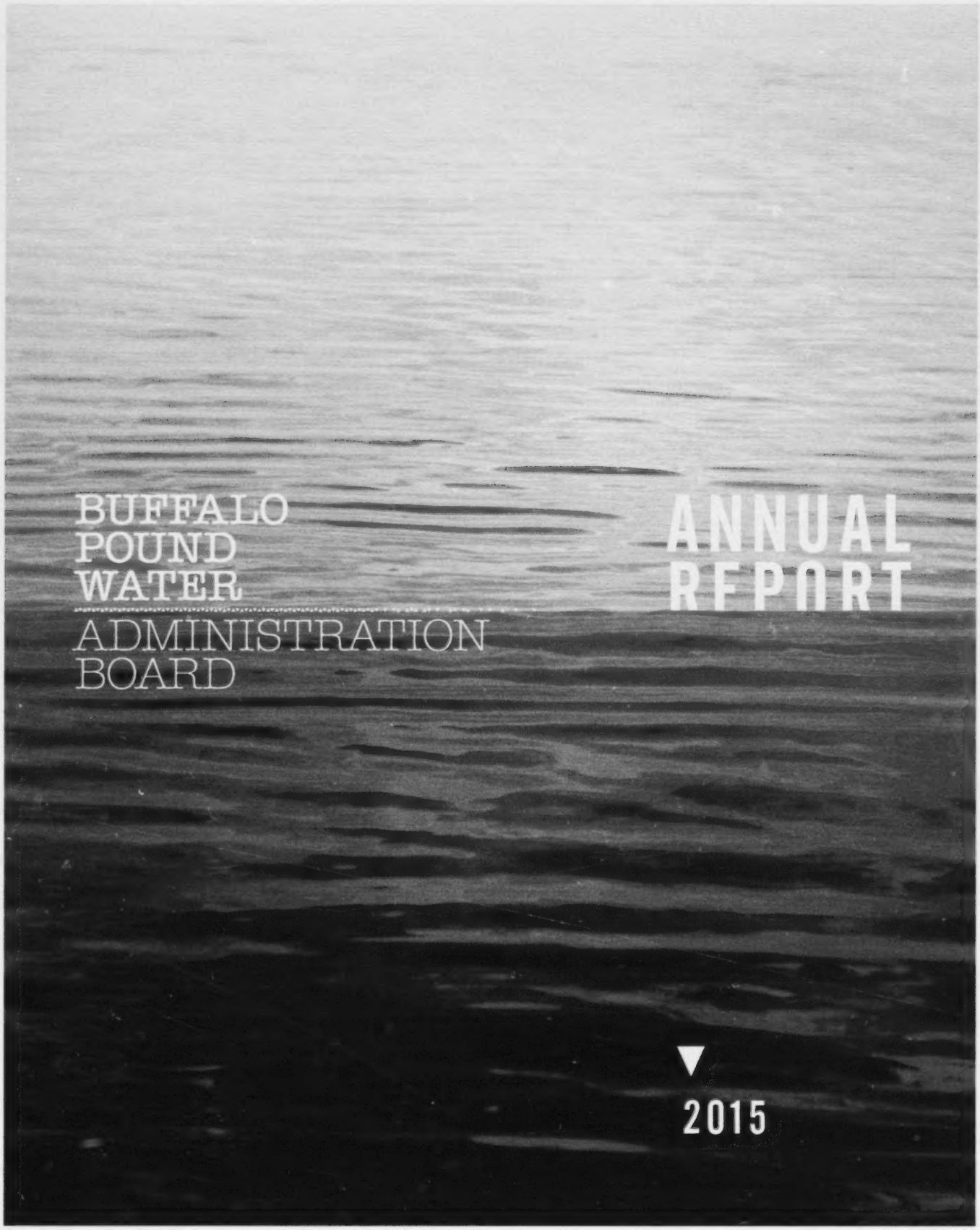

BUFFALO
POUND
WATER
ADMINISTRATION
BOARD
ANNUAL
REPORT
2015

BUFFALO POUND WATER ADMINISTRATION BOARD

The Buffalo Pound Water Treatment Plant is located approximately thirty kilometres northeast of the City of Moose Jaw, Saskatchewan, on Highway No. 301, seventeen kilometres north of the intersection with Highway No. 1.

The Plant's mailing address is PO Box 944, Moose Jaw, Saskatchewan, S6H 2V2.

The telephone number is 306-694-1377.

Information about the Buffalo Pound Water Treatment Plant is also available from the Plant's website. This may be accessed by going to:

http://www.buffalopoundwtp.ca

Plant management staff may be reached by e-mail at the following addresses:

Ryan Johnson
General Manager
ryanj@buffalopoundwtp.ca

Dan Conrad
Plant Chemist
danc@buffalopoundwtp.ca

Rudi Sapach
Plant Engineer
rudis@buffalopoundwtp.ca

Gene Berezowski
Maintenance Manager
gberezowski@sasktel.net

Laurie Wilkinson
Office Manager
lauriew@buffalopoundwtp.ca

2015 ANNUAL REPORT

REGINA
Infinite Horizons | City of Regina

Moose Jaw
SURPRISINGLY UNEXPECTED

TABLE OF CONTENTS

INTRODUCTION		5
BOARD CHAIRPERSON'S LETTER		6
GENERAL MANAGER'S LETTER		7
MISSION AND GOALS		9
STRATEGIC PLAN		9
THE YEAR IN REVIEW		
RESOURCES		10
PLANT OPERATIONS AND MAINTENANCE		14
RESEARCH AND ANALYTICAL PROGRAMS		26
OPERATIONS BUDGET		28
APPENDICES		
APPENDIX 1	WATER QUALITY ANALYTICAL DATA - 2015	31
APPENDIX 2	AUDITED FINANCIAL STATEMENTS - 2015	42

INTRODUCTION

ABOUT THIS REPORT

This report summarizes the activities and major events at the Buffalo Pound Water Treatment Plant (the "Plant") during 2015. The report outlines the Mission and Goals, achievements and areas of concern. It is intended as an information source for City administration personnel, elected officials and the general public. This report also contains the Drinking Water Quality and Compliance Report required by provincial regulations.

BUFFALO POUND WATER ADMINISTRATION BOARD

The Buffalo Pound Water Administration Board (the "Board") was created in 1951 by an agreement between the City of Regina and the City of Moose Jaw (the "Owners"). In accordance with the agreements, the Board is comprised of two senior members of the City of Regina administration and one senior member of the City of Moose Jaw administration.

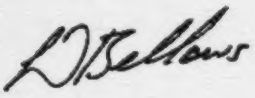
DERRICK BELLOWS

JOSHUA MICKLEBOROUGH

CHUCK MCDONALD

BOARD CHAIRPERSON'S
LETTER

DERRICK BELLOWS
P.Eng., FEC, ICD.D



On behalf of the Board members I am pleased to present the 2015 Annual Report of the Buffalo Pound Water Administration Board.

The Buffalo Pound Water Treatment Plant provided abundant quantities of water to our customers that met or exceeded regulatory requirements and our own standards. That our outcomes are achieved effectively and efficiently, and with a high level of system reliability, is a testament to the dedication, expertise and creativity of our staff.

There were a number of significant accomplishments and initiatives in 2015. We celebrated our 60th anniversary as the water supply for Regina and Moose Jaw. We also continued to prepare for and start addressing challenges of the future. The Board completed its first full year under new governance protocols and positioned itself for changes being made by the owners. The Owners completed their work on revising and improving their joint venture arrangement. In December, the City Councils of Regina and Moose Jaw approved the conversion of the Board into a non-profit corporation proportionately owned by Regina and Moose Jaw. The new entity was named the Buffalo Pound Water Treatment Corporation and was registered with the Saskatchewan Corporate Registry at year end.

Capital improvements moved forward in 2015. Construction began on the project to install ultraviolet disinfection and renew some major electrical infrastructure.

Also, a high risk structural repair was started. Development continued on a long term capital renewal program. Within that, a new electrical project was defined to address significant risk on an accelerated schedule over the next three years.

There were challenges in 2015. Poor raw water quality from Buffalo Pound Lake persisted through the whole year. This required changes to treatment challenging our staff and resulting in increased cost. An operational upset condition in the spring, due to extraordinary weather conditions, severely restricted production for two weeks at a time when demand was increasing dramatically. As well, risks identified with aging infrastructure became failures in electrical areas that resulted in some unscheduled production loss.

Mr. Ryan Johnson provided excellent leadership and direction to the Plant as General Manager. His enthusiasm and commitment supported and empowered Plant staff to sustain a high level of Plant performance through the challenges of the year. The Board greatly appreciates his support and leadership.

I thank my fellow board members, Mr. Chuck McDonald and Mr. Josh Mickelbourgh for their wisdom in decision making through the past year.

The Board is grateful for the continued dedication of Plant management and staff in efficiently operating and maintaining the treated water supply for Moose Jaw and Regina.

GENERAL MANAGER'S
LETTER

RYAN JOHNSON
CD, M.A.SC., P.ENG.

The best way to describe 2015 at the Buffalo Pound Water Treatment Plant is a year of celebration, change and challenge.

Her Honour, The Honourable Vaughn Schofield, Lieutenant Governor of Saskatchewan; Regina Mayor Michael Fougere; Moose Jaw Mayor Deb Higgins; MLA Warren Michelson and many members of the public helped the Buffalo Pound Water Treatment Plant celebrate its 60th anniversary. Dr. Bill Brennan's keynote speech "From Rivals to Partners: Regina, Moose Jaw and Buffalo Pound Water, 1882-1955" provided a wonderful history of the provision of water for our earliest residents. Those attending enjoyed a fly-past by 15 Wing and plant tours.

The most significant change in 2015 came with our preparation for the governance transformation. As a new a non-profit subsidiary of the City of Regina and the City of Moose Jaw, the 1951 and 1991 Joint Venture Agreements were replaced with a Unanimous Membership Agreement approved by both City Councils in December. In anticipation for this change we developed our first strategic plan, an inaugural annual general meeting, a new website, as well as a new logo and brand. Budget process improvements included developing multi-year budgets, introducing the first budget with funded capital projects, introducing the first capital water rate and allowing operating funds to build a reserve.

The year brought significant challenges as the plant faced three power-loss events. A 16-day production event in late spring resulted in the plant not being able to meet our customers' normal water demands. The plant's lack of redundant power and deteriorating electrical infrastructure have a significant impact on the plant's ability to maintain a level of service reliability the cities expect from the plant. Environmental conditions also impact the plant's ability to meet water demands. These events raised the level of understanding of the associated risks that could result in the cities running short of water. We recognize these risks are unacceptable and mitigation is needed.

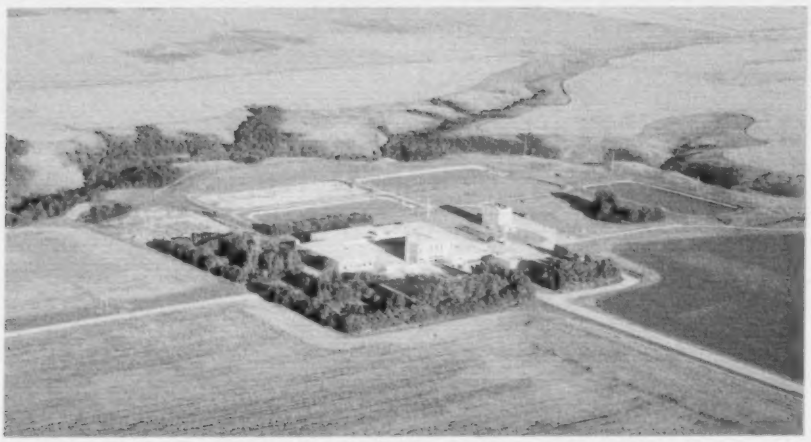
The major capital project, funded by the cities under a 2010 agreement, is now managed by Buffalo Pound Water Treatment Plant. This capital work will allow the plant to continue to meet regulatory requirements while mitigating some of the risks associated with the plant's aging electrical system. Construction began on the ultra-violet disinfection system and Archimedes screw pump. The plant electrical substation and related electrical work design began and is anticipated to be tendered in late 2016. Smaller capital projects proceeded in 2015 with three completed, two in design and two under construction.

The previous unfunded program of work now has approved funding and is part of the Buffalo Pound Water Treatment Plant's Capital Projects. This work is required to maintain the 60-year-old plant to minimize risks and ensure regulatory compliance.

Buffalo Pound Water Treatment Plant continued to develop and improve the Board's Risk Registry, which will assist in strategically targeting where operating and capital funding should be allocated to mitigate risks where possible. The Key Performance Indicators and the 2013 National Water & Wastewater Benchmarking Initiative data, presented to the cities and Board, will assist the plant in making operational decisions.

The quality of the raw water in Buffalo Pound Lake continues to be a major challenge. The raw water quality is very poor and has been degrading continually since 2011.

GENERAL MANAGER'S LETTER CONTINUED



The lake volume has been mixed with Moose Jaw River water as the river backed up into the lake in 2011, 2013 and 2015. As a result of this continued raw water quality degradation, plant chemical dosages were the highest they have ever been – approximately three times higher than 2010. Even with the high chemical use, the treated water remained safe to drink. The organics in the lake have also changed and are now more reactive to chlorine with respect to the production of disinfection byproducts known as Trihalomethanes (THMs). THMs are impacting the cities' ability to meet Provincial Water Regulations and their Permit to Operate. The poor water quality is not expected to change for several years until the lake water volume has changed with water from Lake Diefenbaker. The Water Security Agency is currently studying the Buffalo Pound Lake water quality.

The operating budget experienced a shortfall in 2015, but was within the 20 per cent refundable rate, which was designed to address the variabilities in the plant's operations. Revenues were down 8.3 per cent from the city's forecasted water sales. Expenditures were over budget mainly due to increased chemical purchases, the unanticipated costs for emergency repairs for the electrical failures and the late spring production event.

The Buffalo Pound Water Treatment Plant, which provides safe drinking water to more than 260,000 people, was in full regulatory compliance with respect to the quality of the treated water provided to our customers: City of Regina, City of Moose Jaw, SaskWater and the Buffalo Pound Provincial Park.

I extend my sincere appreciation to all the plant employees and the management team for their dedication and diligence to help us meet and achieve the Buffalo Pound Water Administration Board's Mission and Goals during a challenging, dynamic and exciting year.

I would also like to thank the Board for their guidance, direction and open communication throughout 2015 and I look forward to continuing to build on our successes, address our challenges and explore our opportunities in 2016.

MISSION AND GOALS

MISSION

To provide for the Cities of Regina and Moose Jaw, a reliable and affordable supply of safe, high-quality drinking water which meet the needs and expectations of consumers.

GOALS

- Treated water that meets the quality expectations of the citizens of Moose Jaw and Regina, as well as meeting, or exceeding, all government regulated parameters.
- Operational practices and controls that ensure a continuous and safely-treated supply of water within an environmentally-responsible and cost-efficient operation.
- Judicious monitoring of the treated water from the Plant to the end of the Cities' distribution systems. Appropriate monitoring of the water in Buffalo Pound Lake, the Upper Qu'Appelle River and Lake Diefenbaker to identify long-term trends and areas of concern to protect the water supply.
- Water quality research to identify possible chemical and microbiological contaminants and to test and implement the best available treatment technologies, thus ensuring that the Water Treatment Plant can meet current and future expectations for regulated parameters.

STRATEGIC PLAN 2015 – 2018

Following the Owners' Mid-Year Review meeting held in November, 2014, the Owners requested the preparation of a draft Strategic Plan for review at the 2015 Mid-Year Review meeting. Accordingly, the Board developed its first Strategic Plan in Plant history. The Strategic Plan was approved by the cities at the Mid-Year Review meeting held on November 3rd.

MISSION

To provide for the Cities of Regina and Moose Jaw, a reliable and affordable supply of safe, high-quality drinking water which meet the needs and expectations of consumers.

STRATEGIC DIRECTION (Vision)

By 2018, the Plant delivers on its mission during the transition, operations is more proactive and planned, there is capital investment and water rates are adjusted accordingly so we have the funds we need based on projections – complete total cost.

OPERATIONS

Water Quality	Water Quantity	Maintenance Management	Planning and Capital Projects
(To meet regulatory requirements)	(To provide an uninterrupted supply of water)	(To maintain current equipment and assets)	(To be sustainable)

PEOPLE AND SYSTEMS

Safety Culture	Preventative Maintenance Program: CMMS	Risk Management	Board Member Support	Talent Management
(To reduce injuries)	(To better plan maintenance activities)	(To identify and mitigate risks	(To support new governance Board)	(To align staff to meet the Plant's needs)

FINANCIAL

Customer Service Agreement Management: Water Contract	Capital Procurement Policies & Procedures	Administration Management: Contract Services	Operating & Capital Reserve Management	Budget Compliance
(To set cle expectations)	(To be transparent on procurement	(To identify financial services to the Plant)	(To ensure proper reserve management practices)	(To manage the budget in an unpredictable sales environment)

THE YEAR IN REVIEW

RESOURCES

WATER SOURCE

Water for Regina and Moose Jaw is taken from Buffalo Pound Lake, a shallow reservoir in the Qu'Appelle Valley. The lake is 29 km long, 1 km wide but has an average depth of only 3 metres. The surface area of Buffalo Pound Lake is 2900 hectares inferring it has a capacity of 90 million cubic metres at the "full supply level" of 509.3 metres above sea level. Water levels in Buffalo Pound Lake are controlled by the Saskatchewan Water Security Agency and maintained by the release of water from the Qu'Appelle Dam on Lake Diefenbaker. The mean annual water release from Lake Diefenbaker ranged from 1 to 2 m^3/sec in recent years. Thus, the average residence time of water in the lake varies from eighteen to thirty-six months. Rain, snow melt and flood waters from the Moose Jaw River have compromised water quality. The lake water is potentially affected by discharges from point sources (upstream cities) and non-point sources (agricultural and recreational).

Buffalo Pound Lake is generally free of industrial pollution but is naturally rich in nutrients (phosphate, nitrogen and dissolved organic carbon) which encourage the growth of phytoplankton (typically diatoms in the winter and green algae or cyanobacteria in the summer). Weed growth can also be extensive. Algae and weeds pose many treatment challenges such as high chemical demands and undesirable tastes or odours. The lake and watershed appear to also be impacted by ground waters and surface runoff infusing minerals.

PLANT TREATMENT

Raw water from Buffalo Pound Lake passes through a series of treatment stages designed to remove impurities such as algae, bacteria, clay particles and dissolved organic materials. The objective of this treatment is to produce water that is clear, colourless, odour-free, aesthetically pleasing and safe to drink.

The treatment process consists of six stages: chlorination, cascade de-gasification, coagulation/flocculation, clarification, filtration and carbon adsorption.

Lake water enters a pumping station located on the south shore of Buffalo Pound Lake through two submerged intakes. Raw water is chlorinated and then pumped to the Plant via two pipelines connecting the pumping station to the main treatment Plant. The pipelines are 1.05 and 1.35 metres in diameter, extend a distance of approximately 3,000 metres and rise 82 metres. After reaching the Plant, water is initially divided into two streams, each of which has cascade de-gasification, coagulation/flocculation and clarification. The streams are then recombined for the final stages of treatment, including filtration, carbon adsorption and further chlorination.

Cascade operation is used to remove excessive dissolved gas levels in the raw lake water. Excessive dissolved gases are most commonly produced by photosynthetic bacteria and algae. During cascade de-gasification, the water falls over a series of steps which releases excess dissolved gasses and prevents the formation of gas bubbles in later treatment processes. Clarification and filtration processes could be impeded by gas bubbles that attach to particles of floc, causing them to float, rather than sink, and by causing air binding in the filters.

If conditions warrant, Powdered Activated Carbon (PAC) is added to reduce taste and odour. The use of PAC, while relatively infrequent, is occasionally necessary when granular activated carbon contactors are off line or to temporarily reduce the odour loading when the contactors are on-line.

Coagulation and flocculation are the next steps in treatment. Aluminium sulphate (alum), for the summer season, and polyaluminum chloride, for the winter season, is vigorously mixed with the water. In the process of coagulation, the alum neutralizes surface charges on particulate matter contained in the water and forms a fluffy precipitate (floc) that entraps suspended materials such as algae and clay particles. The water is then stirred slowly in flocculation tanks to allow floc particles to become larger and denser prior to their removal.

The floc-bearing water then flows through clarifiers, where most (more than 95%) of the floc with its entrapped impurities is allowed to settle by gravity to the bottom while clear water is constantly removed from the top. Settled floc is removed from the clarifiers as sludge and is pumped to holding lagoons where it is further separated into clear water (returned to the lake) and solid sludge (removed for disposal).

Any floc that was not removed by clarification is separated in the filtration stage. Water is passed through mixed-media filters consisting of a top layer of coarse anthracite followed by successive layers of fine silica sand, and even finer garnet sand. Any remaining particulate matter or floc is trapped by the filters. Filters are cleaned by backwashing with clean water. The filtration step completes the removal of particulate impurities. The removal of dissolved organic impurities, which are responsible for taste and odour, is accomplished next in the carbon

THE YEAR IN REVIEW CONTINUED

RESOURCES (CONTINUED)

adsorption stage of treatment. Large rectangular tanks (contactors) contain Granular Activated Carbon (GAC) to a depth of 3 metres. Water is lifted by Archimedes screw pumps from the bottom of the filters and taken to the top of the contactors where it is allowed to flow by gravity down through the GAC. GAC contains many microscopic pores which adsorb dissolved chemical impurities. Water is in contact with the GAC for 30 to 80 minutes, depending on flow rates, and emerges freed of the dissolved organic materials which cause objectionable taste and odour. The GAC filtration process at Buffalo Pound was designed for taste and odour removal and is used during periods of poor taste and odour in the raw water; the normal period of operation is from May until December.

All stages of water treatment are now essentially complete. Prior to delivery by pipeline to the consumers, chlorine levels are adjusted, if necessary, to provide adequate disinfection and to counteract any possible contamination encountered during its travel to the cities' reservoir and distribution systems. Water delivered to the City of Moose Jaw is also fluoridated during pumping.

The carbon used in the contactors retains its effectiveness for taste and odour reduction up to six (6) months, after which time it must be regenerated or replaced. It was found to be cost effective as well as environmentally responsible to regenerate the spent GAC rather than to discard it and purchase new. Regeneration is accomplished by heating the spent GAC to 850°C in an oxygen-free atmosphere contained in a fluidized bed gas-fired furnace. Spent GAC is transferred by pipeline as a slurry from the contactors to the furnace, regenerated to process specifications, and returned to the contactors for reuse. Carbon regeneration is usually performed at Buffalo Pound generally from mid-November to mid-April.

ENVIRONMENTAL PROTECTION AND CONSERVATION

The Plant, like any large industrial facility, has the potential to affect the environment. The Plant has facilities in place to handle all process wastes including alum sludge, off gases from the carbon regeneration facility, laboratory wastes, various solid wastes generated by Plant operations, and sewage. The Plant uses a considerable quantity of electrical energy in its operation; conservation efforts give returns in the form of reduced demands on the environment and lower operating costs. Future upgrades to the Lake Pump Station, to convert the pumps to variable frequency drives should also reduce power consumption at the lake and is included in the Capital Budget.

A series of sludge lagoons is used in the treatment of the alum sludge waste stream. This form of sludge management can be very effective in ensuring that the sludge is not released to the environment. Sludge is exposed to a natural freeze-thaw cycle that dewaters it to produce a nearly dry granular material which is transported to a landfill site. Buffalo Pound is one of the few water treatment plants in Canada with the ability to manage waste sludge in this manner.

The natural gas-fired furnace in the carbon regeneration facility produces off gases which are thoroughly scrubbed before release to the atmosphere.

Waste disposal agencies are contracted to handle laboratory wastes and solid wastes generated by the Plant. As it becomes necessary, firms specializing in hazardous waste disposal are contracted to dispose of chemical wastes.

Sewage generated by the Plant is pumped to treatment and evaporation lagoons located on Plant property. The primary lagoon has a geotextile fabric and bentonitic clay liner to prevent seepage.

WATER QUALITY MONITORING

A well-equipped accredited laboratory is located on site and used to monitor the quality of raw and treated water as well as water quality at several intermediate steps in the treatment process. Major process control parameters (turbidity, pH, chlorine residual, particle counts, dissolved oxygen and temperature) are monitored continuously by instrumentation communicating with the Plant process computer system. Analyses are performed for most regulated parameters on a daily to monthly schedule; for other parameters (most trace-level organics and metals) samples are sent to commercial laboratories. Analytical results are compared to Canadian Federal guidelines and to Saskatchewan Ministry of Environment (MOE) objectives. All criteria for safe drinking water were satisfied by the Plant in 2015.

Analyses for a wide variety of physical, chemical, and microbiological parameters are performed in the Buffalo Pound Laboratory. Some 65 different constituents are routinely determined. The 2015 results are summarized in Appendix 1.

The quality of the regenerated granular activated carbon is monitored by Plant staff for a variety of physical and chemical parameters.

A vigorous in-house quality control program is maintained to ensure data generated by the Plant Laboratory is valid. The laboratory is accredited by the Canadian Association for Laboratory Accreditation (CALA) for 30 different chemical and bacteriological parameters. The CALA external audit was conducted during the week of November 23rd. These audits occur every two years and are required for the laboratory to maintain its ISO accreditation. The audit and the preparation for the audit require a large amount of staff time and resources. Items of "non-conformance" were generally minor in nature and addressed within the given timeframes.

PLANT OPERATIONS AND MAINTENANCE

WATER PRODUCTION

Water Production and sales (in megaliters) were as shown in Table 1. (See also related Graphs 1 and 2.) Total sales to the cities in 2015 were 28,043 ML to Regina and 5,645 ML to Moose Jaw. Sales to Regina decreased 1.2% from 2014 and sales to Moose Jaw increased 5.3%.

Sales to the SaskWater Corporation in 2015 increased by 9.4%, to 257 ML. Sales to SaskWater represent less than one percent of the Plant's production.

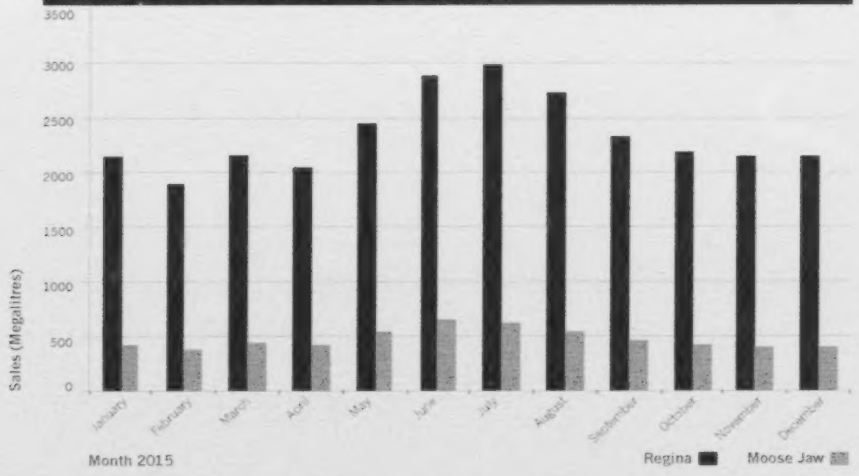
Graph 3 shows annual water production by year since the Plant began operation in 1955.

2015 WATER SALES IN MEGALITRES (ML)
TABLE 1

Month	Regina	Moose Jaw	SaskWater Corp	Totals
January	2138.3	422.0	16.9	2577.2
February	1884.1	371.8	14.5	2270.4
March	2152.7	434.5	17.0	2604.2
April	2043.9	416.5	16.6	2477.0
May	2446.7	542.4	22.5	3011.6
June	2885.8	650.7	25.2	3561.7
July	2987.0	617.8	28.3	3633.1
August	2725.4	535.2	28.5	3289.1
September	2319.1	452.8	27.8	2799.7
October	2182.1	413.8	24.1	2620.0
November	2136.1	392.3	19.3	2547.7
December	2141.5	395.5	16.6	2553.6
Totals	**28,042.6**	**5,645.4**	**257.3**	**33945.3**

GRAPH 1

MONTHLY SALES TO REGINA AND MOOSE JAW

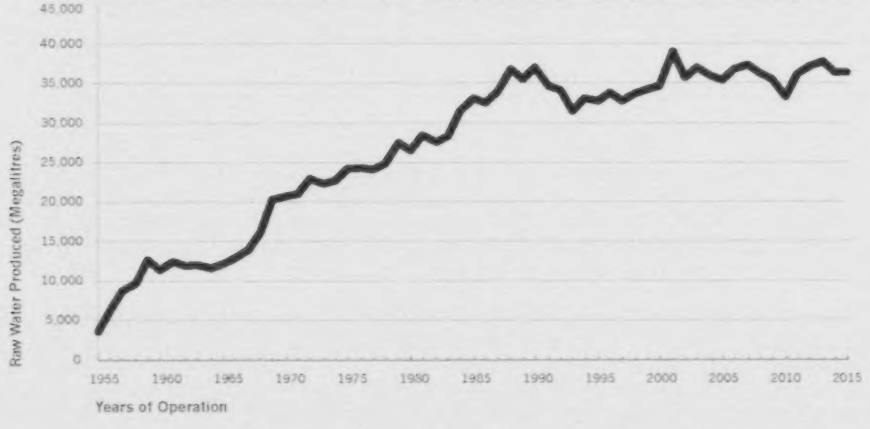


GRAPH 2

ANNUAL SALES TO REGINA AND MOOSE JAW

GRAPH 3

ANNUAL RAW WATER WITHDRAWN



PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

PLANT OPERATIONS

The processes employed at the Buffalo Pound Water Treatment Plant are modified during the year as required by changing water quality in Buffalo Pound Lake. Lake water quality was quite poor particularly in terms of higher than normal dissolved organic carbon and mineral content. The Moose Jaw River flooded into Buffalo Pound Lake for the fourth time in five years. High water levels downstream of Buffalo Pound Lake meant that very little water was released from Buffalo Pound Lake. The Water Security Agency did carry out a controlled release from Buffalo Pound Lake over four days in late May. Unfortunately that short-term release, equivalent to about 4% of total lake volume has thus far provided no benefit to water quality at our lake pumping station.

The high level of dissolved organic carbon in the lake originated within the Buffalo Pound Lake watershed and was particularly reactive with the chlorine used for our disinfection process. Although chlorinated disinfection by-products, specifically measured as trihalomethanes, were higher than normal they were well within the Plant's permit levels. Unfortunately, further reactions of organic carbon and aqueous chlorine within the Cities' distribution systems produced even higher levels. Powdered activated carbon was added to the head end of our treatment train from January through April in an attempt to reduce trihalomethane levels within the distributed water. This process change only resulted in a slight reduction of trihalomethane levels within the Cities' distribution systems. The increased cost from this treatment was over $140,000.

The granular activated carbon contactors were put into operation one (1) month earlier than normal on April 2nd rather than the more typical date of late May. They remained in service until November 12th when they were taken offline to be thermally regenerated. During the first two (2) months of operation, trihalomethane levels were significantly reduced; but after that time only partial removal of trihalomethanes was achieved and that was restricted to the brominated forms.

The Plant also experienced challenges in 2015. There were three (3) power loss events and a sixteen (16) day production event in late spring. This resulted in the Plant not being able to meet the customers' normal water demand. These are explained in greater detail in the Noteworthy Events section.

The lake froze over on November 20th. Cold water temperatures bring about different problems for water treatment. The kinetics of alum coagulation is much slower and so the Plant switched over to a polyaluminum chloride coagulant on November 16th. Polyaluminum chloride forms better floc somewhat faster than alum which benefits the Plant in terms of reduced chemical addition and residuals production.

Another benefit from polyaluminum chloride use is that the finished water is of slightly higher pH and so is somewhat less corrosive. The Plant currently is not set up for the addition of alkaline chemicals that could raise the pH of the treated water to more appropriate levels.

CARBON REGENERATION FACILITY

The carbon is regenerated during the winter so that it can be used to remove taste and odour from the water the following summer. The 2014/2015 regeneration season was from November 12, 2014 to April 2, 2015. The 2015/2016 regeneration season commenced November 12, 2015.

WASTEWATER FACILITY

The clarifier underflow removes particulate matter (alum sludge) from the raw water. The effluent stream is directed to alum sludge lagoons where the sludge is deposited and the clear water overflow returns to Buffalo Pound Lake. The sludge from the stockpile location was removed to the Moose Jaw landfill. The sludge from the east winter lagoon was excavated to the stockpile location.

MAINTENANCE AND CAPITAL PROJECTS

Effective maintenance plays a key role in keeping the Plant running efficiently and producing high quality water. All vessels are drained, cleaned and inspected at least annually. All critical Plant equipment is inspected, tested and maintained at least annually to help ensure satisfactory operation during peak flow demands. All water quality monitoring instruments are checked or calibrated in accordance with the Board's Quality Assurance/Quality Control Policy. The results from major on-line instruments are compared to laboratory instruments.

MAJOR CAPITAL PROJECT

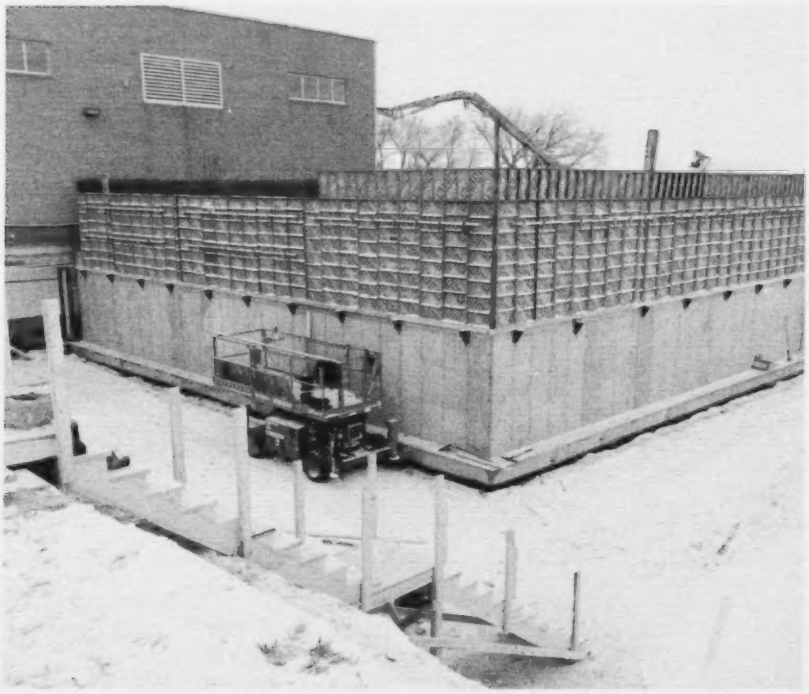
The Cities committed funds in 2010 to upgrade the Plant. The project initially intended to: add ultraviolet disinfection to ensure the deactivation of protozoa cysts; improve the handling of treatment Plant residuals; add an additional screw pump; increase the clear well storage capacity; provide corrosion control and address overall water treatment upgrades for the Plant.

The electrical failures experienced in 2011, as well as the transformer failure in 2013, determined that capital expenditures need to be made to improve the overall reliability of the electrical supply systems in the Plant and lake pumping station. A Code and Condition Assessment and an Electrical Master Plan study was carried out and identified issues that need to be addressed as part of the Plant upgrades.

As the project progressed, pilot testing, condition assessments and studies clarified what works were the most critical. By 2013, the conceptual design cost estimates for the project exceeded the funds available. The scope was reviewed to determine the most urgent items required to be included which are also within the approved budget.

The current Major Capital Upgrade Project scope now includes the ultraviolet disinfection system; an additional Archimedes screw pump; replacement of the Plant's electrical substation and related electrical work for approximately $34.7 Million. During 2015, the remaining scope of work was placed in an unfunded program of work to be addressed at a later date. None of the work in the Major Capital Project or the unfunded program of work includes expansion of the Plant.

UV DISINFECTION FACILITY UNDERWAY



THE YEAR IN REVIEW CONTINUED

PLANT OPERATIONS AND MAINTENANCE (CONTINUED)

In 2015, the UV Disinfection Facility project completed Detailed Design and tendering. Construction started in August. Approximately 20% of the value of the construction was completed in 2015.

Although the Electrical Substation replacement project was awarded for preliminary design and detailed design in 2014, work did not commence till 2015. Preliminary design was nearly complete in 2015. However, three (3) major electrical failures occurred in 2015. Two (2) failures were related to the transmission line to the Lake Pump Station and the third was a failed underground cable at the substation. Since the last failure in October, the projects previously identified have been re-examined and tentatively re-scheduled to minimize the risk of service interruption in the face of electrical infrastructure that has entered the end of its useful life. The proposed adjustment for the Capital Project is to accelerate the electrical work.

CAPITAL PLAN

The unfunded program of work includes all the work which, due to costs or other priorities, could not be completed in the Major Capital Project. The work will be designated as the Capital Plan. This scope of work is still necessary to ensure the Plant continues operating into the future. Worthy of note is the last major Plant upgrade was undertaken in 1989. The unfunded program of work will also assist in addressing the most significant risks that have been identified in the Risk Review which was completed in 2014.

The Capital Plan has identified approximately 30 projects in excess of $140 million dollars if the projects are completed in a relatively short timeframe. If these projects are to be spread out over a longer period of time, escalation costs can force this value to an excess of $200M. Considering the potential dollar values at stake, the Board has

NOTEWORTHY EVENTS

initiated, in 2015, the development of a Business Case to develop the optimal solution for the renewal of the water treatment plant.

In 2015, the 1955 pump room Floor Rehabilitation project construction was initiated and approximately 70% was complete by December. This project was undertaken to remediate deteriorating concrete in the pumpwell as a result of the age of the facility and long term exposure to a chlorinous atmosphere within the pump well.

Numerous other smaller projects were undertaken as required. The most significant projects in the Capital Plan for commencement in the near future are the Lake Pump Station Transmission Line Replacement, Lake Pump Station Redundant Power Supply and Lake Pump Station Pumping Upgrades to mitigate the electrical risks.

Historically, the Plant has constantly reviewed and updated the projects in the Capital Budget. A year to year examination of the projects would illustrate the changing urgency and importance of various projects. 2015 was no different as some projects were advanced as a result of newer experiences and information. Additionally, there are some efficiencies or synergies to be taken advantage of by grouping, ordering or otherwise organizing related projects, while still maintaining budgetary discipline. For example, the project for the Lake Pump Station identified above, will be released as a single package of work, thereby taking advantage of economies of scale and heightened interest and thus more competition due to the total value of the conglomerated project.

NOTEWORTHY EVENTS

Spring Production Event May 24 – June 9, 2015

The Plant experienced production issues that it had never encountered before in 60 years of operations to the magnitude and duration that had occurred in late spring. The Plant was unable to meet the full demand of the Cities for the supply of potable water from May 24th to June 9th.

This initially was thought to be a short lived occurrence of rising floc where the floc particles would carry over from the clarifiers and clog the filters resulting in a much shorter filter run time. In the past, rising floc had been considered a nuisance and did not significantly impact the Plant's production as the Plant would be able to recover any lost production during the late evening and early morning after the minor event had subsided.

This was believed to be caused by dissolved oxygen or pH level changes. The operators could manage these events by either slowing the Plant's production down to allow for more time to settle the floc or by adding more chemical to enhance coagulation.

During this production event, the rising floc occurred for longer durations and repeated daily. There was no time to recover in between these events which slowly reduced the Plant's production to as low as 50 Ml/day production. The increase in chemical did not work nor did slowing down the Plant's production.

The Plant Staff tried several processes and operational changes, chemicals and modifications to try and improve the Plant's production with minimal benefits.

THE YEAR IN REVIEW CONTINUED

NOTEWORTHY EVENTS (CONTINUED)

The rising floc was found to be caused by thermal gradients in the clarifiers where warm water entering the clarifier would rise to the top, taking the floc with it before the floc could have settled. The floc would carry over onto the filters without being removed by the clarifiers as they were designed to do. Once thermal gradation was identified as being the problem, the cause was apparently correlated to environmental conditions. A lack of wind with very warm day time temperatures and cool evenings resulted in the lake being very thermally stratified. The stratification resulted in temperatures of up to 8°C difference within 2 meters of water and it only needs to be a 0.25 °C/hr change in raw water for it to cause thermal gradation in the clarifiers.

The result is that the Plant needs to evaluate the effectiveness of the clarifiers to determine their performance as well as their performance during thermal gradations. This will assist in determining if they can be modified in place or if a different type of clarifier needs to be utilized in the future.

The chemical additive, polymer, will need to be used to improve coagulation of the floc and build a more shear resistant particle. This will also assist in the floc setting faster in the clarifiers. Polymer has not been used since the 1980s. During the event, a polymer was used and continued throughout the year.

The use of constant speed pumps at the Lake Pump Station appears to have had some impact on the rising floc. The concept of replacing these pumps with variable speed drive pumps, in hopes of reducing rising floc events, is being considered. However, this work is already in the Capital Budget primarily to reduce the size of backup power generators at the Lake Pump Station.

Some mixing in the lake was done at one intake for a period of time after the event. However, the benefits were inconclusive as a very small fraction of the water was actually being mixed with the mixers available.

A Capital Project, to review the clarifiers and the treatment processes to determine what, if anything, needs to be done is planned to commence in 2016. Operationally, a suitable polymer has been found, optimized and is ready for the 2016 season.

Power Failures

There were three (3) major power failures at the Plant in 2015.

The first one occured on January 19th. The Plant owned 72kV line that runs from the Main Plant 3kms North to the Lake Pump Station had failed at a very awkward location on top of a hill along the side slope of the valley. A shoe that holds the wire up had failed, releasing a live wire which fell onto a cross member and ignited it.

The Plant was unable to find a contractor willing, on such short notice, and with the correct equipment, to fix the line which had fallen from the pole structure. SaskPower was able to redirect a subcontractor from the K+S Line and they were able to bring the line back into service after 6.5 hours. The line was completely inspected and adjustments were made shortly after that incident.

The second occurred on October 4th. An electrical cable that connects two main transformers at the Main Plant failed. It took over 12 hours to identify the problem and make a temporary repair.

The third event occurred on October 20-21st. The 72kV line that had failed in January failed a second time at the same location. In this case, it is believed that an arc fault had occurred and caused the line to jump where the cable dropped and significantly damaged one pole and destroyed the cross member. Most of the structure

had to be replaced which took almost 24 hours to repair and return the Plant back into service.

During all of these electrical service disruptions, the Plant was unable to produce any amount of water for its customers.

Since these events occurred, the Plant and Cities held discussions on how to mitigate this risk with a plan being developed and submitted for approval.

Governance Review

The governance review project which commenced in 2012 was completed in December. During the year, the Cities, with the assistance of WATSON, had developed a Unanimous Membership Agreement (UMA) which defines the relationship between the Cities and the authorities of the Board. The UMA is the mechanism that replaces the 1951 and 1991 Joint Venture Agreements and changes the Buffalo Pound Water Administration Board to a true governance Board. The new entity is formally known as the Buffalo Pound Water Treatment Corporation, but operationally referred to as Buffalo Pound Water. Buffalo Pound Water was created as a non-profit subsidiary of the Cities under The Non-profit Corporations Act, 1995. The UMA was approved by both City Councils and this was filed along with the Articles of Incorporation in December to take effect in January 2016.

Risk Review

The total number of risks that may impact the Board's ability to supply water to the Cities has increased from 37 risks identified in 2014 to 42 in 2015. Some risks were added based on the ongoing review of the likelihood of occurrence and the associated impact of such occurrence.

As of December 31st, four (4) of these risks are being mitigated or accepted as much as possible with capital projects underway, eleven (11) with operational practices, three (3) with governance changes and one (1) transferred to the Province. A significant number of the risks can be addressed in the future based on the governance changes along with the Board's ability to fund capital projects, effectively reducing these risks over the next 10 years. Several risks, related to power, had their likelihood increased due to the occurrence of the three (3) power outages in 2015.

National Water and Wastewater Benchmarking Initiative

The results of the 2013 National Water & Wastewater Benchmarking Initiative data and peer comparison of other Water Treatment Plants across Canada were presented to the Board and Owners in 2015. The Plant compared relatively well with its peers in Canada. The water rate is generally lower than other Water Treatment Plants and compared well with its goals of Protecting the Public Health, Ensure Adequate Capacity, Environmental Stewardship and Providing a Safe and Productive Workplace. The Plant did not fare as well with Providing Reliable Service and Infrastructure due to a power issue which occurred in 2013 and the historically low capital reinvestment in the Plant.

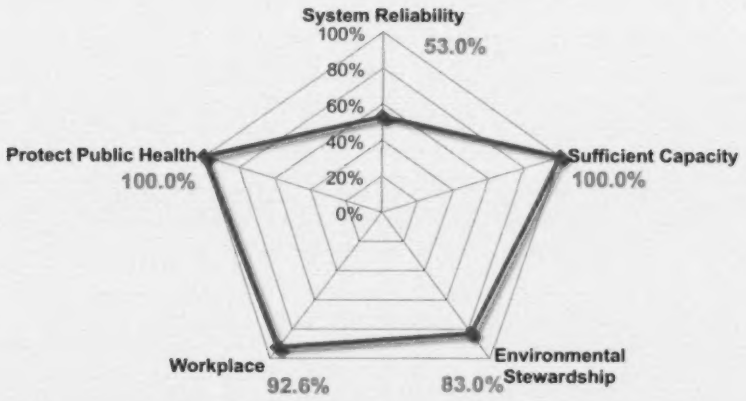
In other areas of the report, the Plant, generally speaking: has less staff compared to other facilities; has higher chemical usage than most facilities; has a higher accident rate; has below average sick time and has a large number of staff eligible to retire within 5 years.

(See chart overleaf)

AECOM

NATIONAL WATER & WASTEWATER BENCHMARKING INITIATIVE

OVERALL RADAR CHART



THE YEAR IN REVIEW CONTINUED

NOTEWORTHY EVENTS (CONTINUED)

GOALS

Provide Reliable Service and Infrastructure

- ☑ 5 year Average Capital Reinvestment / Replacement Value
- ☑ Nr of Unplanned Hours that Plant Could Not Operate at Rated Capacity
- ☑ Unplanned Maintenance Hours / Total Maintenance Hours

Protect the Environment

- ☑ % Residuals
- ☑ GHG Emissions from Energy Consumed/ ML Treated

Protect Public Health

- ☑ # of days over Group Target for Turbidity
- ☑ # of days with Total Coliforms
- ☑ # of days over Group Target for Nitrates

Ensure Adequate Capacity

- ☑ ADD / Existing Licence Capacity
- ☑ Nr of Days Plant Operated at >100% Capacity

Provide Safe and Productive Workplace

- ☑ # of sick days taken per field employee
- ☑ # of Field Accidents with Lost Time / 1,000 Field labour hours
- ☑ # of Lost Hours due to Field Accidents / 1,000 Field Labour Hours

REGULATORY AND GOVERNMENTAL AFFAIRS

The Water Security Agency conducted two routine inspections of the Plant first on March 17th and the second on October 6th. No deficiencies were noted. Since these regulations have been in place, not one deficiency has been observed on any inspection.

All items from the 2014 Environmental Compliance Audit, from the Water Security Agency and Saskatchewan Ministry of Environment, were successfully addressed in 2015. Accordingly, there are no outstanding items.

The Plant's Permit to Operate is in effect to January 1, 2017.

One requirement of the regulations is that the laboratory analytical work required by a Water Treatment Plant's Permit to Operate must be done by an accredited laboratory. The Buffalo Pound laboratory fulfilled all requirements to maintain accreditation from the Canadian Association for Laboratory Accreditation (CALA). The laboratory participates in four sets of proficiency test samples each year.

The Water Regulations require that the Plant submit results of the weekly bacteriological, monthly trihalomethane and quarterly major ion analyses promptly to The Water Security Agency and that a Drinking Water Quality and Compliance Report be published annually.

The required Drinking Water Quality and Compliance Report is provided in the Appendix. The Plant met all sample submission requirements of the Plant's operating permit. The Plant is in full compliance with the Water Regulations.

Plant operations are subject to the Federal National Pollutant Release Inventory (NPRI) Legislation, Canadian Nuclear Safety Commission (CNSC), as well as the Environmental *Emergency Regulations*. The required inventory submissions were made to the NPRI program. Radioactive substances are used in the laboratory's electron capture detectors. Although the licence requirements for electron capture detectors have been terminated by the CNSC, swipe tests are still conducted as part of the general maintenance program. Swipe tests, ensuring the integrity of these detectors, were sent to Saskatchewan Labour for analysis; no leakage above the guidelines was detected.

HUMAN RESOURCES

In 2015, the Plant employed a total permanent staff of 32, consisting of five (5) out-of-scope managers, nine (9) operating staff, five (5) laboratory technologists, seven (7) journeyman maintenance persons, four (4) maintenance persons, and two (2) labourers. The in-scope staff is represented by UNIFOR Local No. 595.

In 2015, the Plant lost two (2) of its employees: one to a sudden passing and the other to an outside employment opportunity and accepted the resignation of two (2) others (due to retirement in 2016). Two (2) employees were also on maternity leave for the majority of 2015 and were backfilled with casual employees.

Staff at the Plant participates in the Regina Civic Employees Pension Plan. The General Manager participated in several meetings to attempt to address the Pension Plan's large unfunded liabilities. Negotiations in 2015 were successfully completed and an agreement was accepted by the Superintendent of Pensions. These new changes will take place in 2016.

The current collective agreement with UNIFOR Local No. 595 expires December 31, 2016.

THE HONOURABLE VAUGHN SOLOMON SCHOFIELD, LIEUTENANT GOVERNOR OF SASKATCHEWAN, ON HAND TO CELEBRATE 60 YEARS OF OPERATION.

THE YEAR IN REVIEW CONTINUED

NOTEWORTHY EVENTS (CONTINUED)

60TH ANNIVERSARY CELEBRATION

In April, 1955, the Buffalo Pound Water Treatment Plant commenced its pumping of water to the Cities of Regina and Moose Jaw and surrounding areas.

To commemorate sixty (60) years of operation, the Buffalo Pound Water Administration Board, together with Plant staff, held a 60th Anniversary celebration on September 3rd which was held outside at the Plant.

We were fortunate to have a number of dignitaries attend the celebration including The Honourable Vaughn Solomon Schofield, Lieutenant Governor of Saskatchewan, Mr. Warren Michelson, MLA and the Mayors from both the Cities of Regina and Moose Jaw

The keynote speech "From Rivals to Partners: Regina, Moose Jaw and Buffalo Pound Water,1882-1955" was presented by Dr. Bill Brennan, Professor Emeritus, University of Regina.

It was a beautiful sunny September day which provided a fantastic backdrop for an amazing fly-past by the Harvards from 15 Wing Moose Jaw.

Public guided tours of the Plant were also hosted by Plant staff.

Members of the public were in attendance along with former and current Board members and former and current Plant staff.

The Board held its Gala afterwards, at the Plant, for all current and former staff and Board members.

WATERWORKS SYSTEM ASSESSMENT

As per the Water Security Agency's Waterworks System Assessment – Round 3 Standards developed in accordance with Section 35 of The Water Regulations, 2002, a Waterworks System Assessment (WSA) for BPWTP is currently required. The waterworks encompasses raw water supply (intakes) and water treatment facilities (including clearwells). The 2015 WSA includes a review and report of information obtained since the BPWTP's most recent assessment in 2010. This WSA report will give communities serviced by the BPWTP a broad understanding of all that is involved with their water system and help ensure safe drinking water.

Since the 2010 assessment, three items remain unresolved and are related to the chlorine facilities. In the effort for continuous improvement, 52 recommendations and potential solutions have been made. The most cost significant of these recommendations that are not identified in the 5 year Capital Budget are the 60 m of raw water line twinning, SCADA upgrades, clarifier upgrades and development of a comprehensive updated drawing set. All except the drawing set are included in the 10 year Capital Plan.

WATERSHED PROTECTION

The Plant continues to be involved in consultation processes dealing with watershed protection in the Upper Qu'Appelle River and Buffalo Pound Lake. The General Manager attended the Annual General Meeting on April 8th.

MISCELLANEOUS

The General Manager and Office Manager attended the National Water and Wastewater Benchmarking Initiative workshop in Whistler, BC.

The General Manager also attended the Design Build Institute of American conference in San Antonio, Texas. This conference was partially sponsored by the Design Build Institute of America.

The Plant Engineer, Plant Chemist and General Manager attended the Western Canada Water and Wastewater Association conference in Winnipeg, MB.

The Maintenance Manager and four staff members attended the Saskatchewan Water and Wastewater Association annual conference in Saskatoon.

The Board Chairman attended the Canadian Water and Wastewater Association conference in Whistler, BC.

THE YEAR IN REVIEW CONTINUED

RESEARCH AND ANALYTICAL PROGRAM

PROCESS DEVELOPMENT

Poor raw water quality in Buffalo Pound Lake and challenging weather conditions stimulated practical researches into better control of our coagulation flocculation and clarification processes. Although the short-comings of the up-flow clarifiers were identified as central to causing our process upsets of late May, laboratory staff also pursued the evaluation of various polymeric coagulation, flocculation and filter aids. Polymeric compounds are used in many Plants as they may allow the reduction of primary coagulant dosages, promote the more rapid growth of larger flocs with better settling characteristics or to enhance the filterability of treated water.

Most successful within the Plant was the application of cationic polymers to the flash mix as a coagulation aid. This application promoted the formation of flocs that were more robust; being resistant to shearing and breakup within the clarifiers. Whether this promising behaviour during normal water conditions assists in dealing with water quality upsets similar to this spring remains to be seen. Less successful was the application of non-ionic polymers as a floc strengthener or filter aid. No measureable benefit in terms of better settling in the clarifiers or lengthening filter runs was observed. The non-ionic polymers did promote the conditioning of water treatment residuals (coagulant sludge) and their dewatering characteristics.

Poor lake water quality manifested itself in another way during 2015. Naturally occurring organic matter within the lake can react with the chlorine applied as a disinfectant forming chlorinated disinfection by-products. Trihalomethanes, one of the most commonly occurring disinfectant by-products, were formed in higher concentrations than typically found. Statistical analysis of trihalomethane formation as impacted by various raw water components and Plant operations indicated that the most important factors affecting the present levels of trihalomethanes were the amount of organic matter and its structure.

High runoff to Buffalo Pound Lake during 2014 nearly doubled the amount of dissolved organic carbon as compared to previous years. Furthermore the dissolved organic carbon was more humic in nature, containing more electron rich structures and higher apparent molecular weight. A meeting was held in April with Water Security Agency staff to discuss these findings and request an increase in diversions of better quality Lake Diefenbaker Water. Our presentation formed the basis of a report circulated to the Cities and Water Security Agency entitled "Raw Water Quality in Buffalo Pound Lake and Its Impact on Drinking Water Quality".

Laboratory staff also pursued research into the impact of reducing or removing pre-chlorination and delaying chlorination until after coagulation and clarification treatment.

The hydrolysis of alum coagulants promotes the destabilization and adsorption of naturally occurring organic matter. By removing that portion of dissolved organic carbon there is less potential for reaction with chlorine and the formation of disinfection by-products. Simply reducing pre-chlorination doses and maintaining a lower free chlorine concentration had a very small impact on trihalomethane reduction.

More successful was coagulating and clarifying raw lake water and only then applying chlorine at disinfection levels. Laboratory experiments were carried out at distributed water temperatures and indicated that in the laboratory at least trihalomethane levels might be reduced significantly, perhaps by 25%. Of course the

laboratory cannot model all distribution system characteristics, most importantly the role that pipe materials might play in consuming disinfectant residuals or promotion of other chemical reactions.

Results from these experiments, the present status of trihalomethane production with the Plant and Cities, as well as alternative practices that the Cities and Water Security Agency might consider were summarized in a report entitled "Recommended Management of Trihalomethane Levels".

Additional Monitoring of Treated and Raw Water

The analyses required in our Permit to Operate represent only a portion of those carried out on our treated water. Seventeen pesticide compounds are listed for testing in our permit to operate. An additional 57 pesticide compounds not listed are also tested for and most of those are without Health Canada Guidelines. Twenty-six additional polycyclic aromatic hydrocarbons are analyzed above the single one required. Three (3) priority pollutants are in our permit to operate. We receive analyses on an additional 53 others. A single glyphosate herbicide is listed on our permit; we analyze for two (2) additional ones. Fourteen (14) volatile priority pollutants are in our permit to operate. We receive results for 49 additional ones. This same suite of analytes is included in raw water samples which are also tested.

WATERSHED MONITORING

Monitoring of the Upper Qu'Appelle River watershed including Buffalo Pound Lake is typically carried out on an annual basis. This year selected sites in the Upper Qu'Appelle River, the west arm of Buffalo Pound Lake and our raw water intake located near the east end of Buffalo Pound Lake were sampled June 9th and 10th . This was soon after the WSA had performed a short-term release of water from Buffalo Pound Lake Water (four (4) days from May 29th through June 1st) coupled with releases of water from Lake Diefenbaker. Improvements in water quality measured as reduced levels of dissolved organic carbon were restricted to the Upper Qu'Appelle River at that time. Although further diversions of water from Lake Diefenbaker occurred intermittently throughout the summer to maintain Buffalo Pound Lake level, no improvement of raw water quality at the Plant has been thus far detected.

Sampling for various pharmaceuticals and anthropogenic compounds was also carried out in June. In the west arm of Buffalo Pound Lake N,N-diethyl-meta-toluamide, better known as DEET was detected at very low level 8 parts per trillion (0.000008 mg/L).

The pesticide 2,4-D was also detected at 23 parts per trillion (0.000023 mg/L) which is 5000 times lower than the Health Canada Guideline. Neither of these compounds was detected in our treated water when sampled in July and October.

For a second summer a buoy with various water quality sensors was deployed near our raw water intakes by the University of Saskatchewan team lead by Dr. Helen Baulch. The sensors again proved their worth by finally explaining the cause of rising flocs in our clarifiers.

Temperature sensors indicated that the water temperature between the surface and our intakes two meters down could differ by up to 8°C during periods of calm or very light winds. The resultant temperature gradients produced uneven flow patterns within the clarifiers. Some plumes of warmer water rise much faster than the settling rate of treatment flocs and carried these over to the filters. This resulted in short filter runs and

THE YEAR IN REVIEW CONTINUED

RESEARCH AND ANALYTICAL PROGRAM (CONTINUED)

turbidity spikes that caused filters to shut down automatically.

The laboratory at the Buffalo Pound Water Treatment Plant has been analyzing many components of raw and treated water over the years. Our database of Buffalo Pound Lake water quality extends from 1969 to the present. Our database of the Upper Qu'Appelle River Watershed which includes Lake Diefenbaker now covers over 35 years from 1979 to the present. These long-term databases prove very useful to various government agencies and researchers that request to use them.

Use of our lake water quality data by university researchers resulted in two publications in the scientific literature. Dr. Helen Baulch and Michael Kehoe from the University of Saskatchewan used historical algae count data to produce regression models for the prediction of odor events in raw water. Some model forms were capable of relatively long term predictions of future odor events (days to weeks in advance). This work was published in the journal Environmental Science and Technology 49 (18) 10984–10992.

Dr. Kerry Finlay from the University of Regina was the lead author in a study examining the role atmospheric warming might play in carbon dioxide flux between hard water lakes and the atmosphere. Ice cover dates and various raw water quality data collected from Buffalo Pound Lake were used in that study. This work was published in the journal Nature 519 215-218.

OPERATIONS BUDGET

The 2015 water rate for the cities of Regina and Moose Jaw increased by 3.75% from the 2014 rate to $235.55 per Megaliter. The electrical rate was set at $0.08717 per KWH for 2015; an increase of 4% from 2014.

The cities of Regina and Moose Jaw forecasted water sales of 30,525 ML and 6,200 ML respectively; an increase of 8.9% from 2014 actual sales or an increase of 2.9% from 2014 forecasted sales. However, actual water sales were down 8.1% from Regina's and 9.0% from Moose Jaw's water sales forecast.

Total water sales to the cities in 2015 were 28,043 ML to Regina and 5,645 ML to Moose Jaw. Sales to Regina decreased 1.2% (from 2014) and sales to Moose Jaw increased 5.3%.

Operations at the Plant resulted in a deficit of $1,242,746 in 2015. This was within the 20% refundable rate which was established to address variances as the Plant has limited control on water sales or on most of its operational costs.

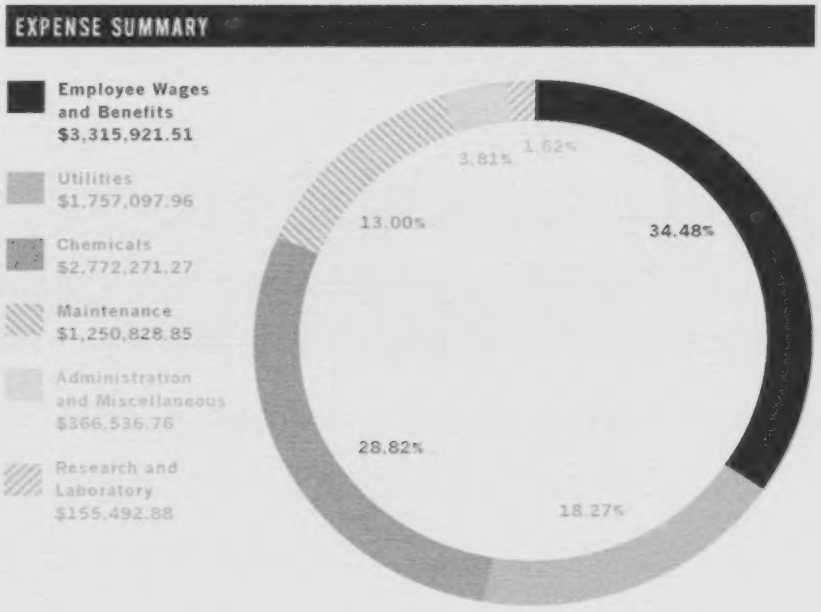
The largest contribution to the deficit was the water sales being significantly lower than forecasted by $713,069 due to the cities overestimating their water use. The actual expenses were over budget by $529,677. The amount of chemical required to treat the water was significantly higher than expected and this has been trending an increase since 2011 when the Moose Jaw River first backed up into Buffalo Pound Lake. The chemical costs alone were $647,271 over budget.

Other expenses over budget were related to the cost of emergency repair work for the three (3) power outages and emergency costs required for the production event in late spring with the rising floc which all were unanticipated costs. Other maintenance work was deferred due to these issues to attempt to offset some of the over expenditures.

Audited financial statements are contained in Appendix 2. Graph 4 on the following page summarizes expenses for 2015 as a percent of the total budget.

GRAPH 4

EXPENSE SUMMARY



APPENDICES

2015

APPENDIX 1
WATER QUALITY ANALYTICAL DATA – 2015

- Drinking Water Quality and Compliance Report for 2015
- Raw and Treated Water Analysis

APPENDIX 2
AUDITED FINANCIAL STATEMENTS – 2015

APPENDIX 1

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2015

INTRODUCTION

The Water Security Agency requires each Permittee to monitor water quality as stipulated under its Permit to Operate a Waterworks. Permittees are also required to prepare an annual report to their customers and the Saskatchewan Water Security Agency summarizing the analytical results of the monitoring in a report entitled "Drinking Water Quality and Compliance Report."

For more information about the meaning and type of sample refer to the Water Security Agency's "Municipal Drinking Water Quality Monitoring Guidelines, or the associated website http://www.saskh2o.ca/DWBinder/epb205.pdf.

The guidelines for Canadian Drinking Water Quality are developed by the Federal –Provincial-Territorial Committee on Drinking Water and are published by Health Canada. The province of Saskatchewan utilizes the guidelines in issuing Permits to Operate for regulated water works. Guidelines for chemical and physical parameters are either:

1. health based and listed as a Maximum Acceptable Concentration (MAC);
2. based on aesthetic considerations and listed as an Aesthetic Objective (AO); or
3. established based on operational considerations and listed as an Operational Guidance value (OG).

Throughout this document the analytical values are reported as well as the units of measure. Many parameters are not detectable in the treated water. Wherever the "less than sign" (<) is used it is followed by the method detection limit. This means that the parameter was not detected at or above the level indicated.

APPENDIX 1 (CONTINUED)

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2015 (CONTINUED)

WATER QUALITY STANDARDS – BACTERIOLOGICAL QUALITY

According to its Permit to Operate a Waterworks the Buffalo Pound Water Treatment Plant is required to analyze one sample every week from the treated water for Bacteriological Quality. Coliforms were never detected in the treated water.

Parameter	Limit	Number of Samples Submitted	Number of Samples Exceeding Limit
Total Coliforms	0 per 100 ml	52	0
Background Organisms	<200 per 100 ml	52	0

WATER QUALITY STANDARDS – FILTER TURBIDITY

The Buffalo Pound Water Treatment Plant is required to monitor the effluent turbidity from all twelve filters on a Continuous Basis. The turbidity from each individual filter shall be less than 0.3 NTU, 95% of the time. The turbidity shall not exceed 0.3 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU. If, on those occasions when the monthly average of the source water turbidity is less than 1.5 NTU, the water turbidity levels from each filter must be less than 0.2 NTU, 95% of the time, the turbidity shall not exceed 0.2 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU.

This Plant's SCADA Control System automatically generates an alarm if a filter effluent turbidity exceeds 0.3 NTU. If the turbidity exceeds 0.4 NTU at any time, the Plant's SCADA Control System automatically closes the filter effluent valve, turning off the filter. The Plant's operating permit requires on-line turbidity monitoring on the effluent of each of its twelve filters. A problem with the turbidity monitor or data transfer system to the Plant's SCADA requires a shutdown of the affected filter. To address this possibility the Plant has a second independent turbidimeter on each filter so that continuous monitoring can be maintained even if the first turbidimeter fails. A fault condition on any one turbidimeter will also generate an alarm.

WATER QUALITY STANDARDS – FLUORIDE

The Buffalo Pound Water Treatment Plant adds fluoride to the water pumped to the City of Moose Jaw and is required to monitor the fluoride level in that water on a continuous basis. The Maximum Acceptable Concentration (MAC) is 1.5 mg/l. Alarms signal a high residual dose at 1.4 mg/L. Fluoride was added to Moose Jaw's water from February 17th through September 21st. Fluoride addition was terminated in September when construction in our clear well required the shutdown of the fluoride addition equipment.

The maximum recorded level of fluoride via a laboratory analysis for water pumped to Moose Jaw was 0.65 mg/L. Fluoride in the water destined for Moose Jaw averaged 0.56 mg/L during the period when fluoride addition was carried out.

WATER QUALITY STANDARDS – CHLORINE RESIDUAL

To ensure adequate disinfection the Buffalo Pound Water Treatment Plant must monitor the chlorine residual of the treated water on a continuous basis and the free chlorine residual shall not be less than 0.1 milligrams per litre. The normal operating range for the free chlorine residual in the treated water is 0.9 to 1.1 mg/l. The SCADA control system will automatically shut off pumping to the Cities if the chlorine level is less than 0.5 mg/l. A high level chlorine alarm will alert the operator if chlorine levels in the clearwell exceed 1.3 mg/L.

WATER QUALITY STANDARDS – CHEMICAL – GENERAL

As part of the Plant's "Permit to Operate" a general chemical analysis is required once in every three (3) month period from the treated water. Only two (2) of these parameters have an established Maximum Acceptable Concentration (MAC). Eight (8) others have an Aesthetic Objective (AO) which is desirable but has no impact on human health. The Plant also does four (4) tests with No Standard (NS) for information purposes.

Parameter (mg/l) unless stated	Feb. 9	May 11	Aug. 11	Nov. 9	MAC	No. of Samples Exceeding MAC or AO
Nitrate	<0.04	<0.04	0.31	0.31	45	0
Fluoride	0.11	0.07	0.09	0.08	1.5	0
					AO	
Alkalinity	213	127	119	138	500	0
Chloride	54.19	28.76	39.58	34.94	250	0
Hardness	346	238	272	273	800	0
Magnesium	37.7	27.3	32.8	33.5	200	0
pH (pH units)	7.40	7.39	7.27	7.20	6.5 - 9.0	0
Sodium	132.0	82.5	106.9	103.5	300	0
Sulphate	362.8	252.4	349.0	332.3	500	0
Total Dissolved Solids	**778**	**526**	**670**	**650**	**1500**	**0**
					NS	
Carbonate	ND	ND	ND	ND	N/A	
Calcium	72.8	52.4	54.4	53.0	N/A	
Conductivity (uS/cm)	1190	817	995	966	N/A	
Bicarbonate	260	155	145	168	N/A	

(ND) Not Detected

WATER QUALITY STANDARDS – CHEMICAL – HEALTH

The Buffalo Pound Water Treatment Plant is required to sample the treated water for the following parameters once in every six (6) month period. Eight (8) of these parameters have an established MAC. Five (5) parameters have guideline values which establish a target that could be expected from well functioning water treatment Plants or are aesthetic objectives for the taste or appearance of treated water.

Parameter (mg/l)	May 20	Nov 12	MAC	Number of Samples Exceeding Limit
Arsenic	0.0008	0.0004	0.010	0
Barium	0.073	0.072	1.0	0
Boron	0.10	0.11	5.0	0
Cadmium	<0.00001	<0.00001	0.005	0
Chromium	<0.0005	<0.0005	0.05	0
Lead	<0.0001	<0.0001	0.01	0
Selenium	0.0003	0.0004	0.01	0
Uranium	0.0001	0.0002	0.02	0
			Guideline	
Aluminum	0.0092	0.018	0.1	0
Copper	<0.0002	<0.0002	1.0	0
Iron	0.0008	0.0007	0.3	0
Manganese	0.0005	<0.0005	0.05	0
Zinc	<0.0005	<0.0005	5.0	0

WATER QUALITY STANDARDS – PESTICIDES

Once per year the Buffalo Pound Water Treatment Plant is required to have the treated water analyzed for the following pesticides. Fourteen (14) of the parameters listed below have an established MAC. Three (3) parameters have no MAC but are required by our regulatory permits to be monitored.

Parameter (mg/l)	July 13	MAC	Number of Samples Exceeding Limit
Atrazine	<0.001	0.005	0
Bromoxynil	<0.0005	0.005	0
Carbofuran	<0.0002	0.09	0
Chlorpyrifos	<0.002	0.09	0
Dicamba	<0.0005	0.12	0
Dichlorprop 2-4DP	<0.0005	N/A	0
Diclofop-methyl	<0.003	0.009	0
Dimethoate	<0.001	0.02	0
Ethalfluralin	<0.001	N/A	0
Glyphosate	<0.0001	0.28	0
Malathion	<0.002	0.19	0
MCPA	<0.001	0.10	0
Pentachlorophenol	<0.002	0.06	0
Picloram	<0.001	0.19	0
Triallate	<0.001	N/A	0
Dichlorophenoxyacetic Acid 2,4 (2,4-D)	<0.0005	0.1	0
Trifluralin	<0.001	0.045	0

WATER QUALITY STANDARDS – DISINFECTION BY-PRODUCT – TOTAL TRIHALOMETHANES

As part of the Plant's "Permit to Operate" an analysis for total trihalomethanes is required once per month from the treated water. The MAC is 0.1 milligrams per litre, or, 100 micrograms per litre (parts per billion) for the sum of the four (4) trihalomethanes on an annual average. The annual average of total trihalomethanes was 76 micrograms per litre which is below the MAC.

Parameter (ug/l)	Jan 12	Feb 2	Mar 2	Apr 20	May 4	Jun 8
Chloroform	56	45	49	79	3	34
Bromodichloromethane	29	24	28	22	1	2
Dibromochloromethane	12	11	12	4	<1	<1
Bromoform	1	<1	1	<1	<1	<1
Total Trihalomethanes	98	80	91	104	4	36

	Jul 6	Aug 17	Sep 8	Oct 5	Nov 9	Dec 1
Chloroform	82	65	52	44	29	26
Bromodichloromethane	21	36	31	28	22	20
Dibromochloromethane	2	8	9	7	7	7
Bromoform	<1	1	<1	<2	1	1
Total Trihalomethanes	105	110	92	79	59	54

WATER QUALITY STANDARDS – DISINFECTION BY-PRODUCT – HALOACETIC ACIDS (HAA5S)

The Buffalo Pound Water Treatment Plant is obligated to sample for Haloacetic Acids every three (3) months. The annual average of quarterly samples (20 ug/L) was well below the MAC which is based on an average of four (4) samples. The results are as follows:

Parameter (ug/l)	Feb 24	May 5	Jul 7	Oct 27	Annual Average	MAC (Average)
HAA5	74.2	<5	<5	5	20	80

WATER QUALITY STANDARDS – CYANIDE AND MERCURY

The Buffalo Pound Water Treatment Plant is required to submit two (2) samples per year for analysis for Cyanide and Mercury.

Parameter (mg/l)	May 20	Nov 12	MAC	Number of Samples Exceeding Limit
Cyanide	<0.001	<0.001	0.2	0
Mercury	<0.00001	<0.00001	0.001	0

APPENDIX 1 (CONTINUED)

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2015 (CONTINUED)

WATER QUALITY STANDARDS – ORGANICS PLUS MICROCYSTIN

The Buffalo Pound Water Treatment Plant is required to submit one (1) sample per year for analysis for various organics including Microcystin LR. Microcystin LR is always sampled during July or August. Organics and pesticides are sampled during summer or winter in alternate years.

Parameter (mg/l)	July 13	MAC	Number of Samples Exceeding Limit
Benzene	<0.0002	0.005	0
Benzo(a)pyrene	<0.00001	0.00001	0
Carbon Tetrachloride	<0.002	0.005	0
Dichlorobenzene 1,2	<0.0005	0.2	0
Dichlorobenzene 1,4	<0.0005	0.005	0
Dichoroethane 1,2	<0.0005	0.005	0
Dichloroethylene 1,1	<0.0005	0.014	0
Dichloromethane	<0.005	0.05	0
Dichlorophenol 2,4	<0.001	0.9	0
Ethylbenzene	<0.0002	0.0024	0
Monochlorobenzene	<0.0005	0.08	0
Tetrachlorophenol 2,3,4,6	<0.001	0.1	0
Toluene	<0.0002	0.024	0
Trichloroethylene	<0.0005	0.05	0
Trichlorophenol 2,4,6	<0.001	0.005	0
Vinyl Chloride	<0.0005	0.002	0
Xylenes	<0.0002	0.300	0
Microcystin	<0.0005	0.0015	0

APPENDIX 1
(CONTINUED)

BUFFALO POUND WATER TREATMENT PLANT LABORATORY ANALYTICAL DATA 2015

RAW AND TREATED WATER ANALYSIS

RAW LAKE WATER ANALYSIS

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	Number of Tests Done
PHYSICAL																	
Colour (Apparent)	Pt/Co	25	25	25	30	35	40	40	40	50	35	20	20	32	20	50	12
Conductivity	µS/cm	1122	1166	1183	990	791	965	947	948	932	939	955	1015	975	791	1183	24
Bench Diss. Oxygen	mg/L	11.8	11.8	11.1	8.6	10.2	8.7	6.9	8.7	8.9	9.5	11.6	12.1	9.6	6.1	12.9	32
Bench Diss. Oxygen	%	88.4	91.4	84.9	66.9	92.8	97.4	79.7	95.4	89.3	84.2	87.9	89.3	88.1	66.9	112.0	32
ON-LINE Diss. Oxygen	%	109.7	101.3		94.8	111.5	100.7	77.3	93.0	94.3	93.4	98.9	100.1	97.1	88.0	128.0	37
Odour	T.O.N.	28	39	40	32	70	85	169	131	144	74	31	58	74	12	200	51
pH	pH units	8.36	8.29	8.16	8.36	8.58	8.74	8.64	8.68	8.74	8.38	8.39	8.32	8.47	7.89	8.99	52
Temperature	°C	3.6	3.9	4.0	5.5	13.1	19.4	22.2	19.7	15.5	9.9	3.9	2.8	10.3	1.0	23.4	52
Turbidity	NTU	1.7	2.6	3.1	4.4	2.5	6.0	8.1	9.9	7.1	8.4	7.7	4.3	5.5	1.4	19.5	52
TDS	mg/L	762	760	810	670	522		626	640	620	620	638	646	665	522	810	11
TDS	mg/L(calc)	914	951	969	792	617	667	744	743	720	726	751	740	778	617	969	
Langelier Index (RTW)	pH units (calc)	0.20	0.12	0.02	0.26	0.54	0.95	0.57	0.68	0.67	0.25	0.18	0.16	0.34	-0.26	0.95	
MAJOR CONSTITUENTS																	
Alkalinity(p)	mg/L CaCO3	<DL	<DL	<DL	<DL	7	10	6	7	7	3	2	1	4	<DL	10	32
Alkalinity(total)	mg/L CaCO3	249	261	267	226	179	190	191	187	186	194	199	215	202	179	267	32
Bicarbonate	mg/L	304	318	326	276	201	207	218	207	209	230	237	251	234	198	326	32
Carbonate	mg/L	<DL	<DL	<DL	<DL	8	12	7	10	9	3	2	1	5	<DL	12	32
Calcium	mg/L	70	74	71	63	54	53	52	53	48	52	54	59	59	48	74	12
Magnesium	mg/L	38	38	39	34	28	30	34	33	32	33	34	37	34	28	39	12
Hardness (total)	mg/L CaCO3	333	351	356	298	238	260	267	268	259	269	280	298	290	238	356	12
Sodium	mg/L	128	129	134	106	82	89	103	109	107	103	105	106	108	82	134	12
Potassium	mg/L	12.6	13.3	13.4	12.0	11.0	11.9	12.7	12.1	11.3	11.0	10.7	11.1	11.9	10.7	13.4	12
Sulphate	mg/L	320	335	340	264	208	237	278	283	270	261	275	282	279	208	340	12
Chloride	mg/L	38.3	40.0	40.3	31.1	24.9	26.9	31.5	31.7	31.1	29.1	30.6	31.6	32.3	24.9	40.3	12
TRACE CONSTITUENTS																	
Aluminum (dissolved 0.45µ)	ug/L	46	17	14	9		72	50	71	73	<DL	69	42	34	<DL	73	19
Aluminum (Total)	ug/L	71	58	201	226		172	335	188	198	334	236	155	172	36	352	19
Ammonia N	mg/L N	0.06	0.16	0.14	0.31	0.20	0.23	0.09	0.06	0.36	0.24	0.12	0.42	0.20	0.06	0.42	12
BOD (5-day)	mg/L	4.5	4.2	4.8	5.9	3.8	5.4	3.2	2.1	4.5	2.8	3.3	2.8	3.9	2.1	5.9	12
Bromide	mg/L	<DL	<DL	<DL	<DL		<DL	<DL	0.14	0.07	<DL	<DL	0.06	<DL	<DL	0.14	11
Chlorophyll a	µg/L	33	26	20	18	14	34	41	48	25	27	11	17	31	11	61	21
Fluoride	mg/L	0.18	0.20	0.19	0.16	0.15	0.16	0.17	0.21	0.18	0.19	0.18	0.19	0.18	0.15	0.21	12
Iron (dissolved)	mg/L	<DL	<DL	<DL	0.02		0.02	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.02	11
Manganese (dissolved)	mg/L	<DL	0.02	0.01	0.15		0.01	<DL	<DL	<DL	<DL	<DL	<DL	0.02	<DL	0.15	11
Nitrate	mg/L	0.08	<DL	<DL	0.09		<DL	0.06	<DL	<DL		<DL	<DL	<DL	<DL	0.09	10
Organic N	mg/L N	0.08	0.87	0.94	0.93	0.82	1.01	0.82	1.17	0.86	0.73	0.74	0.42	0.86	0.42	1.17	12
Raw TOC	mg/L C (UV)	10.8	11.5	10.9	11.3	10.5	10.4	10.8	10.5	10.0	9.6	8.8	9.2	10.3	8.6	12.4	
Raw DOC (GF diss)	mg/L C (UV)	10.6	10.9	10.8	10.8	10.1	10.6	10.7	10.2	10.2	9.6	9.2	9.4	10.2	8.8	11.4	52
UV absorbance @ 254nm	Abs 10cm	2.179	2.217	2.190	2.268	2.052	2.018	1.987	1.877	1.816	1.667	1.574	1.654	1.955	1.566	2.390	52
SUVA	L / mg m	2.061	2.040	2.033	2.095	2.041	1.908	1.889	1.827	1.775	1.737	1.716	1.756	1.904	1.635	2.151	52
PreFM UV abs @ 254nm	Abs 10cm	1.768	1.789	1.771	1.832	1.611	1.570	1.574	1.460	1.420	1.344	1.303	1.350	1.563	1.298	1.952	52
Phosphate(ortho)	µg/L P	11	4	10	55		<DL	23	10	16	24	13	10	16	<DL	55	11
Phosphate(total)	µg/L P	55	52	56	117	61	60	95	92	97	84	63	51	74	51	117	12
Silica (SiO3)	mg/L	3.2	3.1	4.6	5.3	0.3	0.1	2.2	2.6	4.5	5.1	4.7	5.4	3.4	0.1	5.4	12
Sulphide	µg/L																

CONTINUED >

RAW LAKE WATER ANALYSIS (CONT'D)

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	Number of Tests Done
TRACE CONSTITUENTS																	
PreFM																	
TTHM's (total)	µg/L(calc)	76	75	81	109	106	108	126	113	99	74	57	57	86	50	133	
Chloroform	µg/L	44	43	46	60	74	67	77	64	57	41	29	27	51	23	92	42
Bromodichloromethane	µg/L	22	22	24	23	26	32	38	35	29	22	18	18	25	16	40	42
Chlorodibromomethane	µg/L	10	10	10	6	6	9	12	14	12	10	10	10	10	3	14	42
Bromoform	µg/L	<DL	<DL	1	<DL		<DL	<DL	<DL	<DL	1	2	2	1	<DL	2	36
BIOLOGICAL																	
Blue Green Algae (x10^3)	per litre	<DL	<DL	<DL	<DL	389	1236	786	903	941	69	<DL	<DL	376	<DL	2756	52
Green Algae (x10^3)	per litre	1230	1678	720	5128	1275	798	567	989	1462	908	828	876	1340	89	14844	52
Diatoms (x10^3)	per litre	1308	567	267	136	156	322	33	339	809	597	272	107	407	<DL	1644	52
Flagellates (x10^3)	per litre	100	267	189	350	942	1107	1025	1025	1991	1153	317	404	776	<DL	2689	50
Crustaceans	per litre	31	21	57	36	150	76	44	19	17	32	24	32	43	<3	290	51
Nematodes (x10^3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	44
Rotifers (x10^3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	44	45
Other (x10^3)	per litre	<DL	<DL	<DL	2650	111	<DL	<DL	<DL	<DL	<DL	<DL	<DL	240	<DL	7600	45
Total Green & B-G	per litre	1230	1678	720	5128	1664	2033	1353	1892	2403	978	839	880	3680	89	14844	
BACTERIOLOGICAL																	
Total Coliforms	per 100 ml	<DL	<DL	3	<DL	<DL	<DL	2250	6250	1200	300	20	6	918	<DL	8000	45
Total Coliforms (background)	per 100 ml	137	38	362	1000	6550	35725	127500	53000	53900	5290	1275	255	23886	16	236000	50
Fecal Coliforms	per 100 ml	<DL	<DL	<DL	5	2	1	5	10	24	5	1	<DL	5	<DL	66	
Standard Plate Count	per 1 ml	18	50	2132	440	169	595	2363	753	1491	264	143	89	737	6	5914	52
CHEMICAL DOSES																	
Alum	mg/L	120	120	120	118	108	122	123	133	134	129	115		122	95	140	46
Alum\Raw DOC	ratio	11.35	11.04	11.15	10.88	10.71	11.54	11.66	12.90	13.11	13.42	12.37		11.82	9.41	14.14	
Alum DOC Stoich	ratio	0.92	0.90	0.90	0.88	0.87	0.94	0.95	1.05	1.06	1.09	1.00		0.96	0.76	1.15	
Chlorine-pre	mg/L	4.4	5.0	5.4	6.5	4.7	5.1	7.0	7.2	6.2	4.6	3.2	3.4	5.2	2.8	8.4	52
Chlorine-intermed	mg/L																0
Chlorine-post	mg/L	0.9	1.1	1.1	1.1	1.3	1.8	2.1	1.8	1.5	1.5	1.5	0.8	1.4	0.2	2.2	52
Plant Flow	MLD	91.3	77.0	98.6	81.0	102.3	131.8	122.5	102.3	96.0	94.0	91.5	92.0	98.8	41.0	145.0	
Qu'Appelle Dam Flow	cu m/s	1.50	1.53	0.30	0.00	0.58	4.88	6.05	2.20	0.78	0.75	1.60	1.64	1.82	0.0	6.7	
Fluoride (Set Point for MJ)	mg/L	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65				0.65	0.65	0.65	35
Powdered Carbon	mg/L	15.0	20.0	20.0	20.0									18.75	15.0	20.0	0
CPAC Train A	mg//L	41.3	41.5	40.9	41.6							61.0	57.0	57.7	55.0	61.0	6
CPAC Train B	mg//L											61.0	57.0	57.7	55.0	61.0	6
Total Chlorine dose	mg/L (Calc)	5.3	6.1	6.4	7.6	6.0	6.9	9.0	9.0	7.7	6.1	4.6	4.1	6.6	3.8	10.4	52
Date GAC's ON														27-Apr			
Date GAC's OFF														2-Dec			
Date Ice ON Lake														20-Nov			
Date Ice OFF Lake														15-Apr			
Date PAC ON														28-Jan			
Date PAC OFF														27-Apr			
Chlorine Residuals Exit Plant (week avg.)																	
free Chlorine	mg/L	1.11	1.16	1.12	1.11	1.10	1.13	1.19	1.13	1.14	1.16	1.10	1.10	1.13	1.03	1.26	52
Combined Chlorine	mg/L	0.55	0.55	0.53	0.39	0.09	0.22	0.29	0.28	0.27	0.30	0.31	0.47	0.35	0.06	0.62	52

TREATED WATER ANALYSIS

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	Number of Years Data
PHYSICAL																	
Colour (Apparent)	Pt/Co	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Conductivity	uS/cm	1144	1190	1205	1023	817	893	969	980	958	969	966	1035	1008	817	1205	14
Diss. Oxygen	mg/L	13.5	14.1	13.9	13.5	10.4	8.5	7.6	8.6	9.3	10.8	12.2	13.5	11.3	7.6	14.1	12
%Sat. Diss. Oxygen	%	101.7	107.1	106.0	103.1	97.7		89.8	97.1	95.3	94.5	95.9	100.2	98.9	89.8	107.1	11
Odour(Dechlorinated)	TO N	9	7	6	5	<1	<1	1	3	3	3	3	5	4	<1	9	47
PreGAC Odour	TO N				12	15	17	46	41	32	14	7	7	23	6	53	31
Odour Removal by Coagulation and Filtration	%	67.5%	81.0%	82.0%	74.5%	76.3%	77.8%	71.4%	68.4%	77.9%	80.5%	75.4%	87.6%	77.0%	60.0%	93.8%	51
Odour Removal Overall	%	67.5%	81.0%	82.0%	80.2%	98.8%	99.8%	99.4%	98.0%	98.3%	96.5%	89.3%	90.6%	89.4%	60.0%	100.0%	47
PreFM pH	pH units	8.06	7.98	7.86	7.87	8.11	8.23	8.21	8.09	8.19	8.05	8.14	8.02	8.07	7.47	8.72	52
Coagulation pH - Channel 1	pH units	7.41	7.45	7.41	7.04	7.07	6.87	6.88	6.87	6.22	6.84	6.97	7.29	7.02	3.93	7.47	52
Coagulation pH - Channel 2	pH units	7.00	7.04	7.03	6.97	6.91	6.92	6.93	6.96	6.91	6.87	6.99	7.23	6.98	6.77	7.26	52
Clearwell pH	pH units	7.40	7.41	7.33	7.19	7.24	7.19	7.14	7.16	7.11	7.16	7.18	7.37	7.24	6.95	7.50	52
Temperature	°C	3.7	3.8	4.1	5.6	13.3	19.6	22.8	20.5	16.2	10.2	4.0	2.7	10.4	1.2	23.5	51
Turbidity	NTU	0.12	0.10	0.09	0.07	0.07	0.08	0.09	0.08	0.10	0.07	0.06	0.06	0.08	0.05	0.13	52
Total Dissolved Solids	mg/L	774	778	806	682		592	640	670	642	634	650	666	685	592	806	11
Total Dissolved Solids	mg/L(calc)	894	936	954	783	610	659	732	743	717	712	740	778	771	610	954	
Turbidity Log Removal	(calc)	1.17	1.42	1.53	1.77	1.54	1.87	1.93	2.07	1.85	1.96	1.94	1.71	1.73	1.06	2.58	
Langelier Index (RTW)	pH units (calc)	-0.83	-0.81	-0.83	-0.97	-0.86	-1.09	-0.93	-0.90	-1.06	-1.13	-1.15	-0.89	-0.95	-1.15	-0.81	
MAJOR CONSTITUENTS																	
Alkalinity(p)	mg/L CaCO3	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	13
Alkalinity(total)	mg/L CaCO3	205	213	217	177	127	119	122	119	116	127	138	174	150	116	217	14
Bicarbonate	mg/L	250	260	265	216	155	145	148	145	141	154	168	212	183	141	265	14
Carbonate	mg/L	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	13
Calcium	mg/L	68	73	72	64	52	52	52	54	48	52	53	59	58	48	73	12
Magnesium	mg/L	38	38	40	35	27	28	33	33	33	33	34	37	34	27	40	12
Hardness (total)	mg/L CaCO3	329	346	348	300	238	252	266	272	258	264	273	297	287	238	348	12
Sodium	mg/L	126	132	134	108	83	90	104	107	106	103	104	107	109	83	134	12
Potassium	mg/L	12.8	13.4	13.5	12.0	10.9	11.8	12.7	12.1	11.3	11.3	10.7	11.2	12.0	10.7	13.5	12
Sulphate	mg/L	343	363	371	296	252	299	341	349	335	320	332	284	324	252	371	12
Chloride	mg/L	53.9	54.2	55.0	45.0	28.8	33.2	39.3	39.6	38.5	34.4	34.9	62.0	43.5	28.8	62.0	12
TRACE CONSTITUENTS																	
CLEAR WELL																	
Aluminum (dissolved 0.45µ)	µg/L Chart	56	39	48	37		16	20	14	22	11	19	49	30	11	56	11
Aluminum (total)	µg/L Chart	89	69	83	57	13	14	21	12	26	14	20	51	39	12	89	12
Aluminum (total 12 mo avg)	µg/L	58	51	51	53	51	51	51	51	52	52	42	39				0
Aluminum (particulate)	µg/L (Calc)	33	30	35	20		<DL	<DL	<DL	<DL	<DL	<DL	<DL	11	<DL	35	11
Mixed Media Filter A																	0
Aluminum (total)	µg/L	86	58	62	66		44	60	44	74	37	76	93	64	37	93	11
Mixed Media Filter L																	0
Aluminum (total)	µg/L	92	88	90	53		48	36	53	47	31	58	38	58	31	92	11
PREGAC																	0
Aluminum (dissolved)	µg/L						51	29	28	28	22	34		32	22	51	6
Aluminum (total)	µg/L Chart						51	43	48	72	41	69		54	41	72	6
Ammonia N	mg/L N	0.08	0.09	0.10	0.07	0.14	0.07	0.04	<DL	0.16	0.07	0.05	0.11	0.08	<DL	0.16	12
Bromide	mg/L	<DL	<DL	<DL	<DL			<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	10
Fluoride	mg/L	0.10	0.11	0.11		0.07	0.08	0.08	0.09	0.08	0.08	0.08	0.10	0.09	0.07	0.11	11
Fluoride (MJ dose by ISE)	mg/L (wk avg)		0.62	0.56	0.55	0.44	0.62	0.60	0.58	0.55				0.56	0.00	0.65	27

CONTINUED >

TREATED WATER ANALYSIS (CONT'D)

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	Number of Tests Done
Iron (dissolved)	mg/L	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Iron (total)	mg/L	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Manganese (dissolved)	mg/L	<DL	<DL	<DL	<DL			<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	10
Manganese (total)	mg/L	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Nitrate	mg/L N	<DL		<DL	<DL			0.12	0.07	0.08		0.07	<DL	<DL	<DL	0.12	8
Organic N	mg/L N	0.54	0.52	0.53	0.46	0.10	<DL	0.17	0.23	0.21	0.27	0.29	0.42	0.31	<DL	0.54	12
CW TOC	mg/L C	7.2	7.5	7.4	6.5	1.0	2.9	3.9	4.1	4.1	4.3	4.3	5.7	4.9	0.6	7.8	52
CW DOC (GF diss)	mg/L C	7.3	7.5	7.3	6.5	1.0	3.0	4.0	4.1	4.1	4.3	4.4	5.7	4.9	0.6	7.8	52
PreGAC DOC (GF diss)	mg/L C					6.0	6.2	6.5	6.0	5.7	5.6	5.5	5.8	5.9	5.4	6.9	31
DOC Removal by Coagulation & Filtration	% Removal	31.4%	31.0%	32.1%	40.0%	40.2%	41.6%	39.1%	41.3%	44.1%	42.2%	40.3%	37.8%	38.5%	28.6%	46.3%	52
DOC Removal by GAC Filtration	% Removal					83.2%	52.4%	39.1%	31.1%	27.9%	22.5%	20.5%	17.2%	38.6%	16.7%	89.0%	31
Total DOC (% Removal)	% Removal	31.4%	31.0%	32.1%	40.0%	90.1%	72.0%	63.0%	59.6%	59.7%	55.2%	52.5%	40.0%	52.1%	28.6%	93.8%	52
CW Organic Carbon (diss @ 254nm)	Abs 10cm	1.099	1.120	1.092	0.900	0.032	0.222	0.376	0.385	0.415	0.446	0.466	0.760	0.610	0.017	1.140	52
PreGAC Organic Carbon (diss @ 254nm)	Abs 10cm					0.819	0.813	0.841	0.778	0.751	0.738	0.748	0.808	0.785	0.728	0.879	31
Conventional SUVA	L / mg m	1.516	1.494	1.494	1.381	1.365	1.316	1.305	1.313	1.313	1.330	1.367	1.380	1.381	1.176	1.554	52
CW SUVA	L / mg m	1.516	1.494	1.494	1.381	0.297	0.723	0.926	0.944	1.008	1.038	1.070	1.337	1.105	0.210	1.554	11
Phosphate(ortho)	µg/L P	<DL	<DL	3	<DL		8	7	6	<DL	3	<DL	<DL	2	<DL	8	11
Phosphate(total)	µg/L P	7	7	9	11		12	7	11	8	7	5	7	8	5	12	11
Silica (SiO3)	mg/L	3.1	2.9	4.3	5.3	0.6	0.2	1.9	2.8	4.1	4.6	4.4	5.1	3.3	0.2	5.3	12
Sulphide	µg/L																0
CLEARWELL																	
TTHM's (total)	µg/L(calc)	95	87	90	96	4	55	110	109	101	80	57	68	78	3	115	
Chloroform	µg/L	54	49	49	66	3	48	84	65	57	42	29	31	47	3	85	44
Bromodichloromethane	µg/L	28	26	28	23	1	7	24	35	34	29	21	24	24	<DL	37	44
Chlorodibromomethane	µg/L	12	11	11	6	<DL	1	3	8	10	8	7	11	5	<DL	14	41
Bromoform	µg/L	1	<DL	1	<DL	<DL	<DL	<DL	<DL	<DL	1	1	2	1	<DL	2	38
CHANNEL																	
TTHM's (total)	µg/L(calc)	89	84	91	81	109			113	102		61	58	87	55	113	
Chloroform	µg/L	49	47	49	59	74			63	59		28	27	50	27	74	16
Bromodichloromethane	µg/L	27	26	29	18	28			36	30		20	19	26	18	36	16
Chlorodibromomethane	µg/L	12	11	12	4	7			14	13		11	10	11	4	14	16
Bromoform	µg/L	1	<DL	1	<DL				<DL	<DL		2	2	1	<DL	2	14
PreGAC																	
TTHM's (total)	µg/L(calc)					101	107	115	104	99	77	63	58	93	55	121	
Chloroform	µg/L					69	65	67	58	55	42	30	27	54	26	72	
Bromodichloromethane	µg/L					26	32	37	33	31	24	21	19	28	18	38	
Chlorodibromomethane	µg/L					6	9	11	13	13	11	11	10	10	5	15	
Bromoform	µg/L					<DL	<DL	<DL	<DL	<DL	1	2	2	1	<DL	2	
BIOLOGICAL																	
Blue Green Algae	per litre	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Green Algae	per litre	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Diatoms	per litre	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Flagellates	per litre	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Crustaceans	per litre	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	11
Nematodes	per litre	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Rotifers	per litre	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
Other	per litre	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11
BACTERIOLOGICAL																	
Total Coliforms	per 100 ml	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	43
Total Coliforms (background)	per 100 ml	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	43
Faecal Coliforms	per 100 ml																0
Standard Plate Count	per 1 mL	<DL	<DL	<DL	<DL	<DL	1.5	13.0	7.5	1.8	<DL	0.5	0.2	2.1	<DL	30.0	46

TOTAL TESTS DONE: 3792

APPENDIX 2

FINANCIAL STATEMENTS 2015

Deloitte.

Deloitte LLP
2103 - 11th Avenue
Mezzanine Level
Bank of Montreal Building
Regina, SK S4P 3Z8
Canada

Tel: 306-565-5200
Fax: 306-757-4753
www.deloitte.ca

INDEPENDENT AUDITOR'S REPORT

To the Chairman and Members of the Buffalo Pound Water Administration Board

We have audited the accompanying financial statements of the Buffalo Pound Water Administration Board, which comprise the statement of financial position at December 31, 2015, and the statements of operations, reserve for replacement of capital assets, change in net financial assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian public sector accounting standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility
Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion
In our opinion, the financial statements present fairly, in all material respects, the financial position of the Buffalo Pound Water Administration Board as at December 31, 2015, and the results of its operations, change in its net financial assets and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Deloitte LLP

Chartered Professional Accountants, Chartered Accountants
Licensed Professional Accountants

March 31, 2016
Regina, Saskatchewan

Buffalo Pound Water Administration Board

STATEMENT OF FINANCIAL POSITION

[in dollars]

As at December 31

	2015	2014
FINANCIAL ASSETS		
Cash	1,585,704	3,319,210
Accounts receivable		
City of Regina	1,561,420	642,483
City of Moose Jaw	247,380	236,506
Other	266,873	186,468
Deficit receivable (Note 1)		
City of Regina	1,034,462	222,944
City of Moose Jaw	208,284	42,118
Total financial assets	4,904,123	4,649,729
FINANCIAL LIABILITIES		
Accounts payable and accrued liabilities	819,184	377,056
20% Refundable rate (Note 2)		
City of Regina	1,177,182	1,134,899
City of Moose Jaw	410,601	397,713
Employee benefit obligations (Note 4)	550,608	486,680
Total financial liabilities	2,957,575	2,396,348
Net financial assets	1,946,548	2,253,381
NON-FINANCIAL ASSETS		
Inventory of chemicals	109,868	132,954
Tangible capital assets (Note 5)	21,563,116	22,077,890
Accumulated surplus (Note 7)	23,619,532	24,464,225

See accompanying notes.

SIGNED ON BEHALF OF THE BOARD

Board Member

Board Member

Buffalo Pound Water Administration Board

STATEMENT OF OPERATIONS

[in dollars]

For the year ended December 31

	Budget	**2015**	2014
REVENUES			
General water rate charges			
City of Regina operating contributions	7,193,522	**6,608,528**	6,445,138
City of Moose Jaw operating contributions	1,461,092	**1,330,386**	1,217,924
City of Regina capital contributions	719,352	**660,853**	644,514
City of Moose Jaw capital contributions	146,109	**133,039**	121,792
	9,520,075	**8,732,806**	8,429,368
Refundable water rate	1,730,922	**1,587,783**	1,532,612
Power charges	307,797	**276,882**	254,979
Miscellaneous water sales	108,700	**123,905**	113,189
Interest	12,500	**43,046**	43,124
Other	5,000	**29,921**	9,357
	11,684,994	**10,794,343**	10,382,629
EXPENSES			
Employee wages and benefits (Schedule 2)	3,372,000	**3,379,851**	3,134,582
Amortization of tangible capital assets (Schedule 3)	1,746,838	**1,746,838**	1,727,399
Utilities (Schedule 2)	1,791,000	**1,757,098**	1,706,260
Chemicals (Schedule 2)	2,125,000	**2,772,271**	1,880,680
Refundable water rate	1,730,922	**1,587,783**	1,532,612
Equipment maintenance (Schedule 2)	876,000	**855,618**	534,931
Miscellaneous (Schedule 2)	284,200	**259,637**	206,238
Laboratory supplies and maintenance (Schedule 2)	179,900	**155,493**	182,671
Building and ground maintenance (Schedule 2)	328,500	**221,907**	348,465
Administration (Schedule 2)	132,000	**145,286**	167,572
	12,566,360	**12,881,782**	11,421,410
Deficiency of revenues over expenses before refundable surplus	(881,366)	**(2,087,439)**	(1,038,781)
Deficit owing (surplus refundable) from operations allocated as follows:			
City of Regina		**1,034,462**	222,944
City of Moose Jaw		**208,284**	42,118
Change in accumulated surplus		**(844,693)**	(773,719)
Accumulated surplus, beginning of year		**24,464,225**	25,237,944
Accumulated surplus, end of year		**23,619,532**	24,464,225

See accompanying notes.

Buffalo Pound Water Administration Board

STATEMENT OF RESERVE FOR REPLACEMENT OF CAPITAL ASSETS

[in dollars]

For the year ended December 31

	2015	2014
Balance, beginning of year	**2,873,015**	2,586,659
Contributions (Note 2)		
City of Regina capital contributions	**660,853**	644,514
City of Moose Jaw capital contributions	**133,039**	121,792
Interest earned (Note 3)	**37,137**	36,396
Expenditures from reserve for replacement of capital assets (Schedule 1)	**(1,097,020)**	(516,346)
Balance, end of year (Note 6)	**2,607,024**	2,873,015

See accompanying notes.

Buffalo Pound Water Administration Board

STATEMENT OF CHANGE IN NET FINANCIAL ASSETS

[in dollars]

For the year ended December 31

	2015	2014
Change in accumulated surplus	**(844,693)**	(773,719)
Acquisition of tangible capital assets	**(1,247,283)**	(715,482)
Amortization of tangible capital assets	**1,746,838**	1,727,399
Loss on the disposal of tangible capital assets	**15,219**	4,262
Net change in tangible capital assets	**514,774**	1,016,179
Acquisition of inventory of chemicals	**(2,749,185)**	(1,928,292)
Consumption of inventory of chemicals	**2,772,271**	1,880,680
Use of prepaid expenses	**-**	12,642
Surplus (deficit) of expenses of other non-financial assets over expenditures	**23,086**	(34,970)
(Decrease) Increase in net financial assets	**(306,833)**	207,490
Net financial assets, beginning of year	**2,253,381**	2,045,891
Net financial assets, end of year	**1,946,548**	2,253,381

See accompanying notes.

Buffalo Pound Water Administration Board

STATEMENT OF CASH FLOWS

[in dollars]

For the year ended December 31

	2015	2014
OPERATING ACTIVITIES		
Change in accumulated surplus	**(844,693)**	(773,719)
Add back non-cash items		
Amortization of tangible capital assets	**1,746,838**	1,727,399
Loss on disposal of tangible capital assets	**15,219**	4,262
Net change in non-cash working capital balances		
in accounts receivable	**(1,010,216)**	14,779
in accounts payable and accrued liabilities	**442,128**	160,995
in 20% refundable rate	**55,171**	(49,460)
in surplus refundable	**(977,684)**	(284,158)
in employee benefits obligations	**63,928**	43,896
in inventory of chemicals	**23,086**	(47,612)
in prepaid expenses	-	12,642
Cash provided by operating activities	**(486,223)**	809,024
CAPITAL ACTIVITIES		
Acquisition of tangible capital assets	**(1,247,283)**	(715,482)
(Decrease) Increase in cash position	**(1,733,506)**	93,542
Cash, beginning of year	**3,319,210**	3,225,668
Cash, end of year	**1,585,704**	3,319,210

See accompanying notes.

Buffalo Pound Water Administration Board

NOTES TO THE FINANCIAL STATEMENTS

[in dollars]

For the year ended December 31, 2015

1. BASIS OF OPERATIONS

The Buffalo Pound Water Administration Board (the Board) was formed under a 1951 agreement, amended in 1991, between the cities of Moose Jaw and Regina for the purpose of operating the water treatment facility at Buffalo Pound Lake to provide a water supply to the two cities at cost (the Agreement). Any surplus (deficit) in a particular fiscal year is distributed to (charged to) the cities according to their respective usage.

Effective January 1, 2016 the Board became Buffalo Pound Water Treatment Corporation incorporated under *The Non-Profit Corporations Act, 1995*.

2. SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Board are the representation of management and have been prepared in accordance with Canadian public sector accounting standards, as recommended by the Chartered Professional Accountants of Canada (CPA Canada). Significant aspects of the accounting policies adopted by the Board are as follows:

Use of estimates

The preparation of financial statements in conformity with Canadian public sector accounting standards requires management to make estimates and use assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the year. Actual results could differ from those estimates.

Employee benefit obligations

Employee benefit obligations relating to severance or retirement benefits are recognized to the extent that they are vested and could be taken in cash by an employee on termination.

Pension benefit obligations

The Board is one of the sponsors of a multi-employer defined benefit pension plan. The Board follows defined contribution accounting under which pension expense is limited to the Board's contributions to the plan.

Inventory of chemicals

Inventory of chemicals are valued at the lower of net realizable value and average cost.

Capital contributions

The funding for capital assets is through one of two means, from the Reserve for Replacement of Capital Assets or through a separate funding agreement between the cities of Moose Jaw and Regina (the cities).

Article 3 of the Agreement between the cities requires an additional contribution from each city equal to 10% of the general water rate for every mega litre of water sold. This contribution funds the Reserve for Replacement of Capital Assets from which capital assets may be funded. For major capital projects that the reserve is unable to fund, a separate agreement between the two cities may be struck in order to provide funding for the project. Contributions from the cities under Article 3 of the Agreement or through a separate agreement are shown as capital contributions for financial statement purposes.

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Operating contributions

Under the terms of the Agreement, each city pays the Board for water and electricity used based upon the following rates established by the Board:

	2015	2014
General water rate, $ per mega litre	**235.66**	227.15
Electricity rate, $ per kilowatt hour	**0.08717**	0.08382

These revenues are recognized as the water is delivered to the cities' water distribution systems. Other revenues are recognized when earned and measurable.

Refundable water rate

Under Article 5 of the Agreement, the Board receives an additional 20% of the general water rate from the cities for every mega litre of water sold. At each fiscal year end, the proceeds of these payments are refunded in proportion to the cities' respective capital investment in the Board.

Financial instruments

The fair value of cash, accounts receivable, accounts payable and accrued liabilities, the 20% refundable rate and the surplus refundable/deficit owing approximates the carrying value given their short term nature.

Tangible capital assets

Tangible capital assets are recorded at cost which includes all amounts that are directly attributable to acquisition, construction, development or betterment of the asset. The cost, less residual value, of the tangible capital assets are amortized on a straight-line basis over their estimated useful lives as follows:

General	
Land improvements	20 years
Vehicles and equipment	6 to 20 years
Office and information technology	10 to15 years
Infrastructure	
Plants and facilities	5 to 40 years
Roads	25 years

Assets under construction are not amortized until the asset is available for productive use.

Tangible capital assets received as contributions are recorded at their fair value at the date of receipt and also are recorded as revenue.

Leases are classified as capital or operating leases. Leases which transfer substantially all of the benefits and risks incidental to ownership of property are accounted for as capital leases and recorded as tangible capital assets. All other leases are accounted for as operating leases and the related lease payments are charged to expenses as incurred.

Credit Risk

Credit risk is the risk of financial loss to the Board if a customer or counterparty to a financial instrument fails to meet its contractual obligations. The Board's credit risk is primarily attributable to accounts receivable. This risk is limited as accounts receivable is due mainly from the City of Regina and the City of Moose Jaw.

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Liquidity Risk

Liquidity risk is the risk that the Board will not be able to meet its financial obligations as they become due. The City of Regina staff on behalf of Buffalo Pound manages liquidity risk by continually monitoring cash flow requirements to ensure that it has sufficient funds to meet obligations when they become due. The Board has an agreement with the City of Regina and the City of Moose Jaw, where each billing cycle Buffalo Pound collects an additional 10% of the billable service cost of water purchase as a contribution to their capital reserve and an additional 20% for working capital funding.

Interest Rate Risk

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in the market interest rates. The Board is not exposed to significant interest rate risk.

3. RESERVE FOR REPLACEMENT OF CAPITAL ASSETS

The Statement of Reserve for Replacement of Capital Assets shows allocated interest to the Reserve of $37,137 ($36,396 in 2014). This represents the interest earnings for the year and is transferred in accordance with Article 3 of the Agreement. The interest is calculated by applying the prescribed rate, being bank prime less 1.2%, to the average monthly reserve balance to a maximum of the actual interest earned on the funds.

4. EMPLOYEE BENEFIT OBLIGATIONS

The unfunded employee benefit obligations accrued at year end are as follows:

	2015	2014
Vacation pay	**258,048**	206,498
Vested termination payments	**292,560**	280,182
	550,608	486,680

Based upon an agreement with UNIFOR Local 595, termination payments for union employees vest after 15 years of service or upon retiring at the age of 65 after 10 years of continuous service. The amount payable on termination after vesting is 20 hours pay for each completed year of service.

For out-of-scope employees the termination payments vest after 10 years of service. The amount payable on termination after vesting is the wages the employee would have been paid had the employee worked for a time equal to their unused sick days on termination date. The maximum termination payment to an out-of-scope employee is 78 days pay.

Buffalo Pound Water Administration Board is a member of the City of Regina Civic Employees' Superannuation and Benefit Plan (the Plan), which is overseen by its own Administrative Board. All eligible permanent and probation employees of the Board are members of the Plan. This multiemployer Plan provides defined retirement benefits and is integrated with the Canada Pension Plan (CPP). The Plan provides a lifetime monthly pension based on an employee's years of service and the average of the best three consecutive years of earnings. For 2015 employees contributed 9.42% (2014 - 9.42%) of their earnings below the CPP maximum and 13.96% (2014 - 13.96%) of earnings above the CPP maximum and the Board matches employee contributions.

Financial statements as at December 31, 2014 indicate the Plan had a deficit (unfunded liability) of net assets available to pay accrued pension benefits of $70,410,000 (2013 - $117,911,000).

The Plan is a multiemployer defined benefit plan; therefore neither benefits nor contributions are segregated by employer. The Plan managers have been unable to determine the portion of any unfunded liability attributable to each employer. Accordingly, no portion of the deficiency has been recognized as a liability or expense in the

4. EMPLOYEE BENEFIT OBLIGATIONS (Continued)

financial statements. The Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of pension expense is equal to the contributions required for the year. Penson costs of $260,835 ($270,016- in 2014) based on employer contributions were expensed during 2015.

Buffalo Pound Water Administration Board is a member of the Regina Civic Employees' Long-term Disability Plan (the Disability Plan). Financial statements as of December 31, 2014 indicate a surplus of net assets available for benefits of $24,154,000 (2013 -$21,727,000).

The Disability Plan is a multiemployer plan and consequently, identification of individual employer's assets is not available from the Disability Plan managers. Accordingly, no portion of the surplus has been recognized as an asset or expense reduction in the financial statements. For in scope employees, disability benefits are based on 70% of the member's salary and will be paid either throughout the duration of the disability, until the member elects voluntary early retirement, reaches age 65 or upon death, whichever occurs first. 90% of the member's salary will be paid as disability benefits to OOS employees for two years period. The Disability Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of benefit expense is equal to the contributions required for the year. Member contributions are made to the Plan at a rate of 0.92%, with the employer matching contributions. The Board recorded disability premium costs for 2015 of $20,786 ($21,422- in 2014).

Dental and medical plans are also provided for most employees and are paid for by the Board.

5. TANGIBLE CAPITAL ASSETS

	NET BOOK VALUE	
	2015	2014
General		
Vehicles and equipment	**294,304**	333,449
Office and information technology	**36,107**	41,149
Infrastructure		
Plants and facilities	**20,505,545**	21,643,463
Assets under construction	**727,160**	59,829
	21,563,116	22,077,890

For additional information, see the Schedule of Tangible Capital Assets (Schedule 3). During the year there were no write-downs of assets (2014-$nil). In addition, there were no assets contributed to the Board (2014-$nil).

6. CAPITAL INVESTMENT IN ASSETS/CAPITAL PROJECTS

The Capital Investment represents the contributions made by each of the cities under Article 3 of the Agreement, as well as those made under separate agreement, which have been used for capital purposes. Each City's investment is proportionate to the amount contributed. For additional information, see Capital Investment (Schedule 1).

Capital Investment

	2015			2014
	Regina	**Moose Jaw**	**Total**	Total
Balance - beginning of year	**56,759,516**	**21,315,046**	**78,074,562**	77,558,216
Additions funded by:				
Reserve for replacement of capital assets	**813,331**	**283,689**	**1,097,020**	516,346
Balance - end of year	**57,572,847**	**21,598,735**	**79,171,582**	78,074,562

Capital Reserve

	2015			2014
	Regina	**Moose Jaw**	**Total**	Total
Balance - beginning of year	**3,181,318**	**(308,303)**	**2,873,015**	2,586,659
2015 10% Capital contributions	**660,853**	**133,039**	**793,892**	766,306
Interest allocation	**27,533**	**9,604**	**37,137**	36,396
Capital purchase	**(813,331)**	**(283,689)**	**(1,097,020)**	(516,346)
Balance - end of year	**3,056,373**	**(449,349)**	**2,607,024**	2,873,015

Total Capital Investment

	2015			2014
	Regina	**Moose Jaw**	**Total**	Total
Balance - beginning of year	**59,940,834**	**21,006,743**	**80,947,577**	80,144,875
Percentage allocation 2014	**74.05**	**25.95**	**100**	-
Balance - end of year	**60,629,220**	**21,149,386**	**81,778,606**	80,947,577
Percentage allocation 2015	**74.14**	**25.86**	**100**	

7. ACCUMULATED SURPLUS

Accumulated surplus represents the equity of an organization. In determining accumulated surplus, revenues and expenses are recognized as they are earned and incurred, according to Canadian public sector accounting standards as recommended by CPA Canada.

	2015	2014
Investment in tangible capital assets	**21,563,116**	22,077,890
Reserve for replacement of capital assets	**2,607,024**	2,873,015
Employee benefit obligations (Note 4)	**(550,608)**	(486,680)
Accumulated surplus	**23,619,532**	24,464,225

Buffalo Pound Water Administration Board **Schedule 1**

CAPITAL INVESTMENT

[in dollars]

For the year ended December 31

	2015	2014
Balance - beginning of year	**78,074,562**	77,558,216
Additions financed by reserve for replacement of capital assets		
Screw pump	-	130,956
LPS pump	-	83,561
Filter influent channel seperator	**20,674**	-
Security upgrades	**22,703**	8,373
LPS pump C pump and motor	**14,505**	-
Alum tank liner	-	124,939
DOC analyser	-	39,354
Vulnerabilities assessment	-	(3,737)
2015 Waterworks system assessment	**49,510**	-
1955 Pumpwell slab reinforcement	**668,477**	12,412
Roof repair	**263,205**	-
Surface wash pump replacement	**32,446**	-
Carbon regen plant roof	-	68,925
Backwash tank	-	36,367
Office furniture	-	15,196
Clarifier valves	**8,500**	-
Backwash tank and pipelining	**8,500**	-
Clarifier metering tanks piping	**8,500**	-
	1,097,020	516,346
Balance - end of year	**79,171,582**	78,074,562

Buffalo Pound Water Administration Board **Schedule 2**

SCHEDULE OF EXPENDITURES

[in dollars]

For the year ended December 31

	Budget	**2015**	2014
EMPLOYEE WAGES AND BENEFITS			
Wages - permanent employees	2,620,000	**2,519,031**	2,465,532
Employee benefits - permanent employees	557,000	**488,104**	472,048
Overtime wages - permanent employees	127,500	**157,305**	102,643
WCB premiums	35,000	**21,856**	21,162
Premium pay - permanent employees	15,400	**20,055**	14,243
Car allowance	10,600	**9,934**	10,219
Clothing and boot allowance	4,000	**4,774**	2,311
Wages - casual employees	-	**75,691**	-
Employee benefits - vacation, sick and termination	-	**63,928**	43,896
Employee benefits - casual employees	-	**4,886**	-
Overtime pay - casual employees	-	**2,307**	-
Supplementary maternity/parental leave	-	**10,731**	-
Employee awards and gifts	2,500	**1,249**	2,528
	3,372,000	**3,379,851**	3,134,582
UTILITIES			
Electricity	1,510,000	**1,517,089**	1,438,647
Natural gas	281,000	**240,009**	267,613
	1,791,000	**1,757,098**	1,706,260
CHEMICALS			
Alum	1,500,000	**2,210,754**	1,587,033
Granular activated carbon	400,000	**300,000**	126,401
Chlorine	150,000	**144,113**	134,484
Powder activated carbon	75,000	**117,404**	32,762
	2,125,000	**2,772,271**	1,880,680
EQUIPMENT MAINTENANCE			
Filtration plant	376,000	**45,814**	176,950
Wastewater system	190,000	**185,697**	86,468
Regeneration plant	145,000	**185,633**	119,198
Pump station	50,000	**54,070**	13,066
Computer and communications	75,000	**94,935**	86,047
High power electrical	20,000	**148,622**	26,156
Pipeline	20,000	**30,658**	27,046
Other maintenance	-	**110,189**	-
	876,000	**855,618**	534,931

Buffalo Pound Water Administration Board **Schedule 2**

SCHEDULE OF EXPENDITURES (CONTINUED)

[in dollars]

For the year ended December 31

	Budget	2015	2014
MISCELLANEOUS			
Insurance	60,000	**62,051**	60,963
General supplies	28,000	**5,383**	5,526
Telephone	16,000	**17,010**	16,384
Professional and membership fees	24,000	**23,410**	10,404
Travel and conventions	23,500	**14,756**	11,411
Maintenance - vehicles	45,000	**34,794**	26,207
Stationary and office supplies	21,500	**26,908**	23,867
Advertising	11,200	**8,064**	12,255
Education and training	15,500	**16,932**	25,083
Reception and meetings	23,000	**24,866**	3,861
Contracted and other services	15,500	**9,413**	5,999
Software maintenance	1,000	**704**	-
Tangible capital asset (gain)/loss	-	**15,219**	4,262
Foreign exchange (gain)/loss	-	**127**	16
	284,200	**259,637**	206,238
LABORATORY SUPPLIES AND MAINTENANCE			
Laboratory supplies	71,400	**80,466**	81,968
Accreditation program and research	56,000	**21,768**	57,057
Laboratory equipment	42,500	**45,169**	37,024
Contract analytical	10,000	**8,090**	6,622
	179,900	**155,493**	182,671
BUILDING AND GROUND MAINTENANCE			
Filtration plant	300,000	**200,080**	323,738
Regeneration plant	13,000	**9,456**	14,746
Lake pump station	15,500	**12,371**	9,981
	328,500	**221,907**	348,465
ADMINISTRATION			
City of Regina administration	32,000	**36,475**	34,109
Board expenses	15,000	**7,885**	119,608
Audit services	15,000	**19,115**	13,855
Board advisory services	70,000	**81,811**	-
	132,000	**145,286**	167,572

Buffalo Pound Water Administration Board **Schedule 3**

SCHEDULE OF TANGIBLE CAPITAL ASSETS

[in dollars]

For the year ended December 31

	General			Infrastructure				
	Land Improvements	Vehicles and Equipment	Office and Information Technology	Plants and Facilities	Roads	Assets Under Construction	2015	2014
Cost								
Beginning of year	11,373	1,016,580	52,581	78,312,843	2,321	59,829	**79,455,527**	78,798,288
Add:								
Additions during year	-	11,853	-	544,250		691,180	**1,247,283**	715,482
Transfers from assets under construction	-	-	-	23,849		-	**23,849**	-
Less:								
Disposals during year	-	-	-	511,155	-	23,849	**535,004**	58,243
End of year	11,373	1,028,433	52,581	78,369,787	2,321	727,160	**80,191,655**	79,455,527
Accumulated amortization								
Beginning of year	11,373	683,131	11,432	56,669,380	2,321	-	**57,377,637**	55,704,219
Add:								
Amortization	-	50,998	5,042	1,690,798	-	-	**1,746,838**	1,727,399
Less:								
Accumulated amortization on disposals	-	-	-	495,936	-	-	**495,936**	53,981
End of year	11,373	734,129	16,474	57,864,242	2,321	-	**58,628,539**	57,377,637
Net Book Value	**-**	**294,304**	**36,107**	**20,505,545**	**-**	**727,160**	**21,563,116**	22,077,890

BUFFALO
POUND
WATER

FOR ANOTHER
SIXTY YEARS